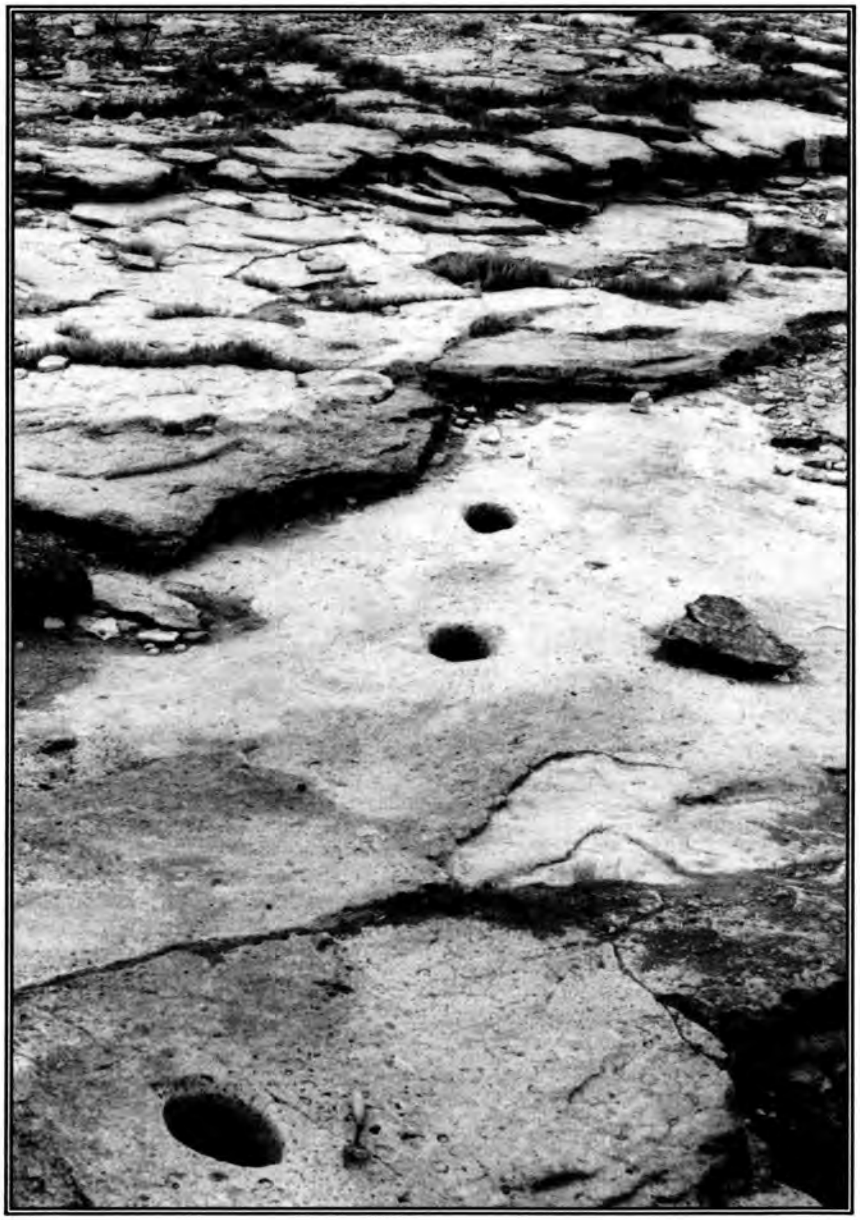
LA TIERRA



VOLUME 21, No. 3
July, 1994

JOURNAL OF THE
SOUTHERN TEXAS
ARCHAEOLOGICAL
ASSOCIATION

LA TIERRA

QUARTERLY JOURNAL OF THE SOUTHERN TEXAS ARCHAEOLOGICAL ASSOCIATION

Volume 21, No. 3
July, 1994

Evelyn Lewis
Editor

About the Cover: Photo is of some boat-shaped mortars in Reagan County. See article on page 3.

Drawings by Richard McReynolds are on pages 7, 15, 16, 17, 18, 19, 20, 23, 27, and 38.

Manuscripts for the Journal should be sent to: Evelyn Lewis, Editor, *La Tierra*, 9219 Lasater, San Antonio, Texas 78250. Past issues of the Journal and Special Publications available by requesting an order form from STAA (Jim Mitchell), P. O. Box 791032, San Antonio, Texas 78279. Dr. T. R. Hester may be contacted at the Texas Archeological Research Laboratory, BRC 5, 10100 Burnet Rd, Austin, Texas, 78712-1100.

For membership information contact the Membership Chairman, Kay Allison, 301 East Rosewood, San Antonio, Texas 78212 (210-733-1744).

STAA mailing address: P.O. Box No. 791032, San Antonio, Texas 78279.

For use of the STAA Lending Library, contact Anne Fox or Kay Allison at the Archaeology Laboratory, The University of Texas at San Antonio, San Antonio, Texas 78249.

All articles in *La Tierra* are now summarized in *Abstracts in Anthropology* published by the Baywood Publishing Company.

La Tierra is now printed on acid-free paper.

Library of Congress Catalog No. 76-649774.

All contributions to this Non-Profit organization are tax deductible.

Printed by LEBCO GRAPHICS, Boerne, Texas

NOTES ON SOUTH TEXAS ARCHAEOLOGY 1994-3

A Case of Mistaken Identity: A Hafted Stone Tool That's Not from the Nueces River Drainage, Southern Texas

Thomas R. Hester

In 1872, Sir John Evans published a classic volume that was one of the first syntheses of stone tool research. Though the volume is entitled *The Ancient Stone Implements, Weapons, and Ornaments of Great Britain*, Evans brought together data on stone tools from around the world.

In his first edition of this volume, Evans devoted Chapter VI to a detailed study of "celts." He reviewed the various ways in which polished stone axes (or celts) were hafted. He drew on museum specimens and ethnographic examples from many countries. And, on page 140, he illustrated a hafted stone implement reputedly from the Nueces River drainage in southern Texas (Figure 1).

Evans (1872:140) wrote:

"I have engraved, in Fig. 94, an extremely rude example of this kind of hafting [celts hafted at right angles to wooden handles] from an original kindly lent me by Mr. Thomas Belt, F.G.S., who procured it among the Indians of the Rio Frio, a tributary of the Rio Nueces in Texas. The blade is of trachyte, entirely unground and most rudely chipped. The club-like haft is formed of some endogenous wood, and has evidently been chopped into shape by means of stone tools."

The woodcut engraving of the specimen, as reproduced here in Figure 1, was shown at "1/6" of its actual size. It is 4 inches (102 mm) long in the Evans volume, and one must assume that the actual specimen is about two feet in length, with the bit of the stone tool about 3.5 inches (90 mm) wide.

The raw material of the stone artifact in the wooden handle is described as "trachyte," which if correctly identified by Evans is likely andesite, a fine-grained igneous extrusive.

Thomas Belt was an English mining engineer, whose travels took him to Australia, Nova Scotia, Central America, Russia, and the United States. His rather lengthy bibliography ranges from an early interest in insects, to a series of publications, known to some lithic technology bibliophiles, dealing with British paleolithic artifacts, and those of similar shape (but not of the same age) in New England. He reportedly made annual trips to Colorado, and on the last one, in September, 1878, he died at the age of 45.

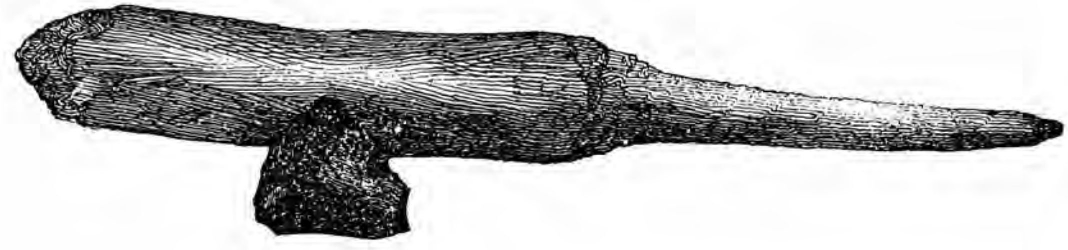


Figure 1. A Hafted Stone Implement Not From Southern Texas. From Evans (1872:140). According to Belt (1911:35), this specimen is from the Río Frio area of Nicaragua.

Now, it would be of great interest and of ethnohistoric importance if this artifact came from the Indians of the Rio Frio in southern Texas. That was how I first reacted to seeing the specimen on page 140 of Evans' book: it was very exciting and I circulated copies of the illustration and description to several colleagues. However, the story has a sad ending, with reference to its south Texas origins! Upon doing research into publications authored by Thomas Belt, I discovered that he had indeed obtained the stone axe from Indians on the "Río Frio" – but in *Nicaragua,* not south Texas (Belt 1911:35)! According to a footnote in Belt (1911), apparently added by Anthony Belt who had edited the 1911 volume, the artifact was "erroneously stated...to be from Texas" in the first edition of Evans (1872). Thomas Belt had obtained the specimen during a visit to Nicaragua. He had gotten it from "rubber-men" who had brought with them "many little articles that they pillage from the Indians" (p. 35) of the Río Frio, near the town of San Carlos.

Don't believe everything you read in (archaeological) print. Even the distinguished Sir John Evans got his provenience data mixed on at least this one occasion.

References

Belt, Thomas
1911 *The Naturalist in Nicaragua.* J. M. Dent and Co., New York.

Evans, Sir John
1872 *The Ancient Stone Implements, Weapons and Ornaments of Great Britain.* First edition. Appleton, New York.

IN APPRECIATION

The STAA Board has expressed their great appreciation for the printing services of Lebco Graphics, now in Boerne, Texas. Lebco has been our printer since the mid-1970s, and has consistently furnished *La Tierra* printings of which we have been proud over the years. They have always been very helpful in giving expert advice for setup and content, and in excercising great care with our many photos. *La Tierra* has always been a fine drawing card for new members in STAA. In essence, Lebco has contributed significantly to the success of the Southern Texas Archaeological Association.

BOAT-SHAPED MORTARS IN REAGAN COUNTY, TEXAS

Larry Riemenschneider

ABSTRACT

The purpose of this paper is to report, describe and discuss boat-shaped mortars in Reagan County, Texas.

INTRODUCTION

Forrester (1991), in his paper describing pestles used with boat-shaped mortars, cites Sayles' and Fox's descriptions and locations of boat-shaped mortars in Texas. Boat-shaped mortars (elliptical mortar holes cut deeply into limestone bedrock) have been reported over a large area of western Central Texas. The name "boat-shaped" comes from the cross section appearance, which resembles a canoe (ibid.).

SITE LOCATION

During a recent survey of Big Lake Draw, three boat-shaped mortars were located and recorded on University Lands. Site 41RG43 is located on the south bank of Big Lake Draw in southeastern Reagan County, four miles southeast of Big Lake, Texas. Big Lake Draw is the main tributary of a playa known as Big Lake. The mortars are located on the lowest of four limestone bedrock shelves that form the southern bank of the draw. This outcrop of limestone bedrock continues approximately 400 meters west and perhaps 100 meters east of the site. The top of the bedrock bench that houses the mortars is 20 cm above the silt level that is the bottom of the draw. The first terrace (elevation 2,620 feet) south of the mortars yielded a scatter of lithic materials with no temporally diagnostic artifacts. A recorded site adjacent to the mortars on the northern bank of the draw produced artifacts indicative of a Middle to Late Archaic component (see Figure 1; also see Figure 2).

MORTAR LOCATIONS AND DESCRIPTIONS

Mortar Number 1 is 2.8 meters from the silt bottom of the draw and is oriented northeast to southwest (Figure 1). The dimensions at the surface are 19 x 30 cm with a depth of 40 cm. The base of the mortar is basin-shaped with a breakthrough in the bedrock in the northeastern portion of the base.

Mortar Number 2 is 2.1 meters from the silt bottom of the draw and is oriented northeast to southwest. The dimensions at the surface are 20 x 31 cm with a depth of 43 cm. The bottom of the mortar is basin-shaped with a breakthrough in the bedrock at its deepest point.

Mortar Number 3 is 34 cm from the silt bottom of the draw and is oriented north-northwest to south-southwest. The dimensions at the surface are 20 x 30 cm with a depth of 37 cm.This basin-shaped mortar is also broken through the bedrock at its deepest point.

SUMMARY

The three boat-shaped mortars in Big Lake Draw may be related to the open campsites that surround them; however, their function is problematic. An observation made in the general area may relate to the possible usage of the mortars. Forty meters east of the mortars is an abandoned water well with windmill anchor legs still in place. The well was drilled in the same level of bedrock as the mortars. The question is asked "Why did the mortars break through the bedrock?" If they functioned in food preparation, they were used until they broke through and were considered worn out and abandoned, or could they have been deliberately ground to break through the bedrock and allow seepage of water into the mortar from under the bedrock; therefore, providing a source of water during a very dry period. The historic well drilled nearby tends to support this theory.

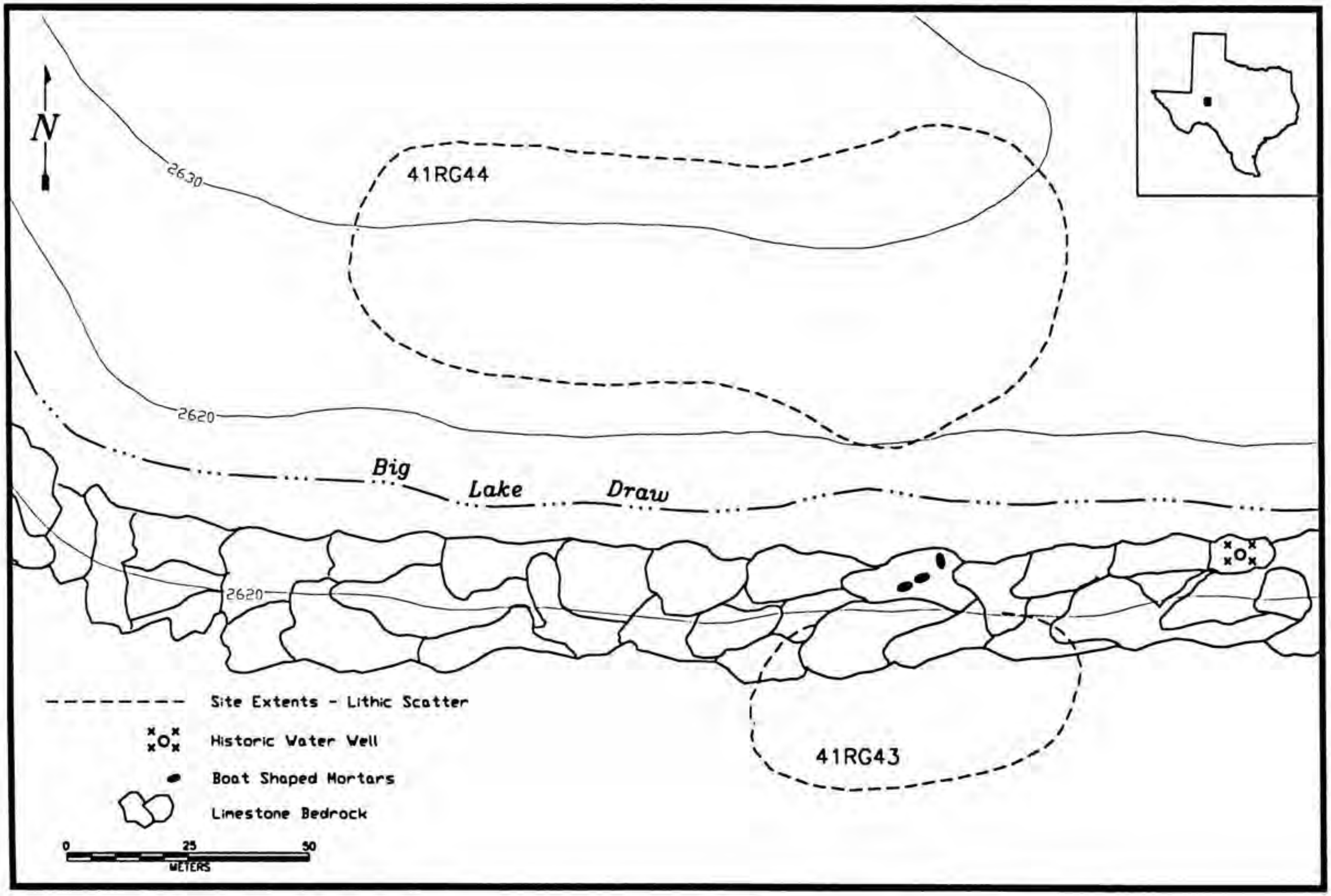


Figure 1. Plan view of site of boat-shaped mortars found in Reagan County, Texas. Drawing by Carol Meddler.

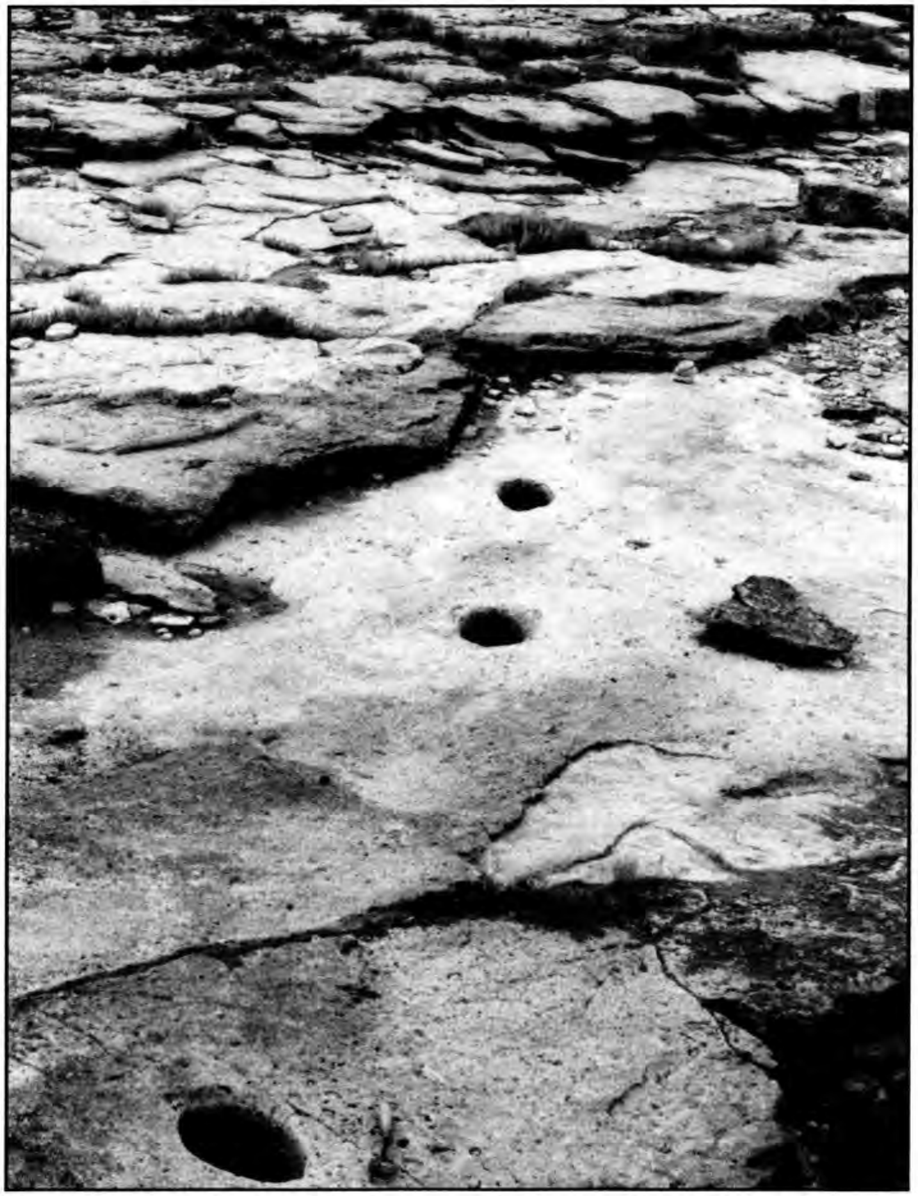


Figure 2. Photo of boat-shaped mortars in Reagan County. Photo by Carol Meddler.

ACKNOWLEDGMENTS

A very special thanks to Steve Hartmann, Director of University Lands in Reagan County, for the opportunity to survey and record sites along Big Lake Draw. Also a special thanks to David Faries for finding the mortars and informing the crew from the Texas Archeological Research Laboratory of their location. Those involved in the survey project include Dr. Solveig Turpin, Jeff Turpin, Steve Carpenter, Carol Meddler, and Doug Drake.

Also a special thanks to Carol Meddler for the photography and computer graphics of the site.

Reference

Forrester, R. E.
1991 Pestles for Boat-Shaped Mortars in Texas. *Bulletin of the Texas Archeological Society* 60:191-207.

FOLSOM POINTS FROM DEEP SOUTH AND SOUTHWEST TEXAS

C. K. Chandler and Don Kumpe

ABSTRACT

This paper documents and describes six Folsom points from south and southwest Texas. All except one are from counties bordering the Rio Grande River. The one exception is one point from Duval County.

INTRODUCTION

Folsom points are widely distributed in Texas (Largent 1991). However, there are still large areas where none have been reported. The statewide survey of the distribution of Folsom points in Texas identified 329 Folsom points from 57 counties (ibid.). Obviously Folsom specimens are not uniformly distributed across the 254 counties of Texas.

Seventeen Folsom points from nine counties in south and southwest Texas were reported by Hester (1974). The six specimens reported here include three from Zapata County where one Folsom has been reported (ibid.), one from Duval County where none are previously reported, one from Hidalgo County where none are previously reported and one from Maverick County where only one is previously reported (Hester 1968). None of the coastal counties south of Corpus Christi have yielded a Folsom point that found its way into print (see Figure 1).

THE ARTIFACTS

Specimen 1, Figure 2, A-A', is a fragmentary Folsom point found on the surface of a site along an arroyo in southwest Zapata County in 1974 by Don Kumpe. It is made of light grayish brown good quality chert having a glossy surface and waxy feel indicating it was probably heat treated. Dimensions are: L (Length), 47.2 mm; W (Width), 22.6 mm; Base Width, 20.5 mm with a basal concavity of 5 mm; weight is 6.1 grams. It is 20 mm wide at 10 mm above the lowest point of the base. It is 2 mm thick in the fluted area with a maximum thickness of 4.7 mm at the lateral break. The basal nipple is missing and the basal concavity is neatly retouched. Edges are ground 31 and 34 mm. It has one narrow flute scar on the obverse (9 mm x 41 mm) and two flute scars on the reverse. The first of these flutes is 10 mm wide and extends beyond the distal break. The second of the flutes overlaps the first and angles to one side to the lateral edge and continues to a minimum length of at least 32 mm where it is intersected by secondary flaking from the broken area. It is without patina. Other artifacts from this site include Golondrina and one Early Stemmed point.

Specimen 2, Figure 2, B-B' is a Folsom point midsection found on the surface of a site near Arroyo Tigre Chiquita about 7.5 miles (12 km) northeast of the town of Falcon in Zapata County by Don Kumpe in 1969. It is made of light gray good quality chert with patina on all surfaces. Dimensions are: L, 24 mm; W, 23.7 mm; T (Thickness), 4.2 mm. It is fluted

Figure 1. Part of south and southwest Texas showing area of discussion in paper.

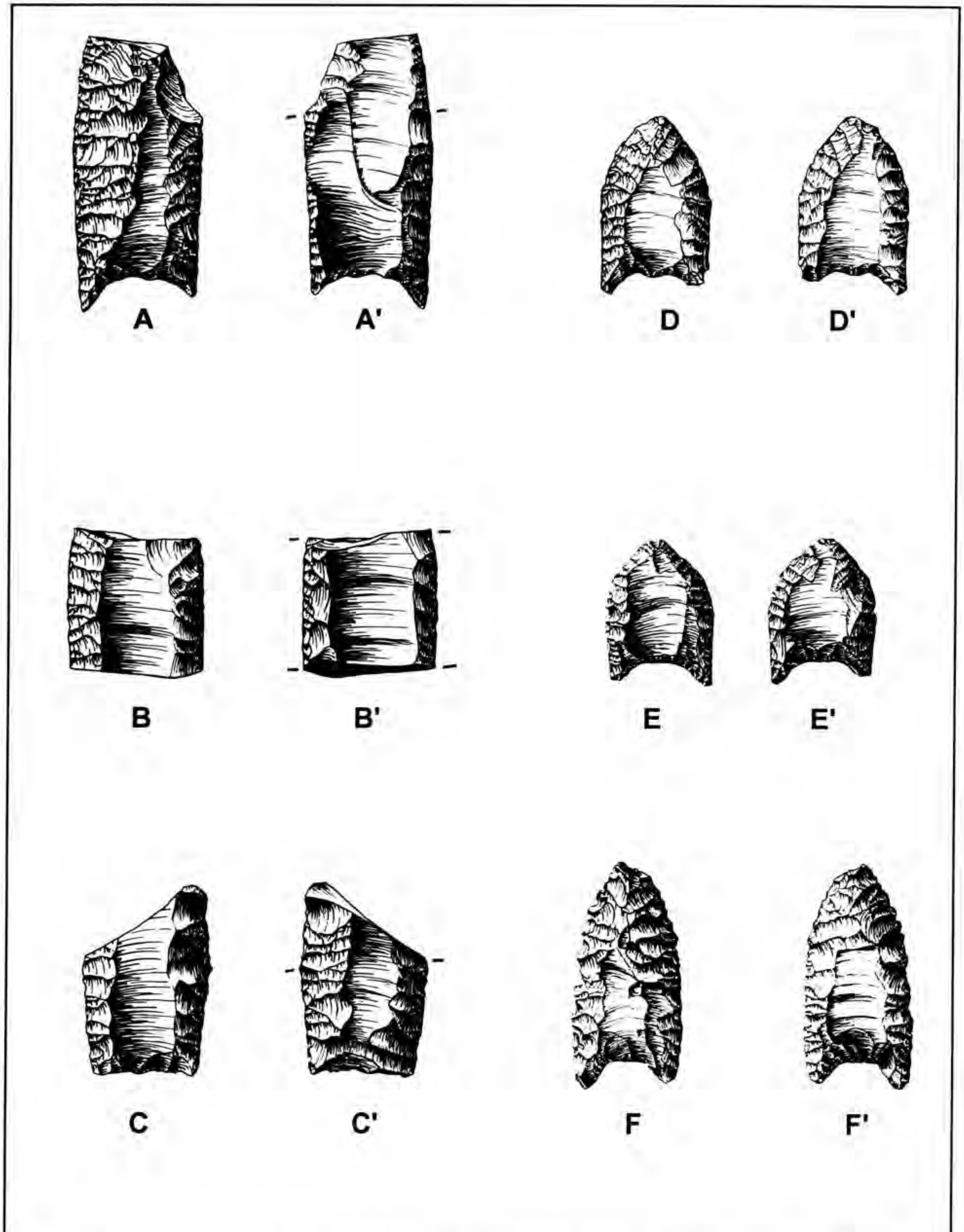


Figure 2. Folsom points from deep south and southwest Texas. A-A', Zapata County; B-B', Zapata County; C-C', Zapata County. D-D', Duval County; E-E', Maverick County; F-F', Hidalgo County.

on each face and these flutes are 14 mm and 15.5 mm wide respectively. Lateral edges are ground full length. It weighs 4.4 grams.

Specimen 3, Figure 2, C-C' is a Folsom point basal fragment from a shoreline site along Falcon Lake west of the town of Zapata in Zapata County. It was found by Don Kumpe in 1982. It is made of what appears to be good quality chert but is heavily coated with patina on all surfaces and the true color can not be determined. Both basal ears are broken and the basal nipple is missing. Edges are ground 18 and 20 mm. Dimensions are: L, 32.8 mm, W, 22 mm, T, 4.2 mm. There is one flute on each face; one is 9 mm wide and one is 11 mm wide. Both flutes extend beyond the broken edge. It weighs 3.4 grams.

Specimen 4, Figure 2, D-D' is a nearly complete Folsom point made of translucent misty gray chalcedony. It was found by Al Lopez in 1986 on the surface of a site (41DV133) in west Duval County while deer hunting. One basal ear is broken and the other has a tiny chip missing. Part of the basal nipple is present. Flaking is neat parallel. It is fluted on both faces. The flute on one face is 21 mm long by 9 mm wide. The other flute is 25 mm long by 10 mm wide. Artifact dimensions are: L, 30 mm; W, 19.2 mm at 18 mm from the longest ear. It is 4 mm thick near the distal end where the flutes terminate. It is 1.8 mm thick just above the nipple in the fluted area. Base width is 19 mm and the basal concavity is 3 mm. It weighs 3.3 grams.

This specimen was found at the outer edge of the site and no other projectile points were found in the immediate vicinity. Leo Lopez, a brother of Al, reported the specimen to Rose Treviño who promptly reported it to the Office of the State Archeologist. C. K. Chandler was requested to evaluate the site to determine if it was a Folsom occupation site. Leo, Rose, C. K. and Virginia Chandler visited the site and made a diligent search for confirming evidence. Nothing but a thin scatter of flakes was found within 150 meters (492 feet) of the location of the Folsom find.

This site is quite large and has extensive surface erosion that has scattered several stone hearths and other cultural debris. The lithic collection from this site was all from the Archaic through the Late Prehistoric time period and has been reported by Chandler and Lopez (1992).

Specimen 5, Figure 2, E-E' is a complete but rather small Folsom point found on the surface along the bank of Tequesquite Creek in the northwest corner of Maverick County about one mile north of Highway 277. This creek runs into the Rio Grande River a short distance southwest of Highway 277. This specimen is an isolated find by Thomas Wooten and only one other lithic artifact was found in this area.

It is milky white on one face and light grayish white on the other. Most of this white color is patina. Parent material appears to be light grayish tanchert with a few small quartz inclusions. While no other projectile points were found in association, both Golondrina and Victoria points are known to occur in this general area.

Dimensions are: L, 26 mm; W, 18.7 mm; T, 3.3 mm; Base Width: 17.3 mm. One basal ear is broken. Basal concavity is 3 mm. Weight is 1.9 grams. It is fluted on both faces. The obverse flute is 19 mm long and 10 mm wide. This flute extends to within 4 mm of the distal tip. The flute on the reverse is 17.7 mm long and 11 mm wide. The basal nipple is missing and the basal concavity is finely retouched on both sides. One lateral edge is ground 14 mm, the other is ground 12.5 mm. This is the edge with the broken basal ear.

Specimen 6, Figure 2, F-F' is a complete Folsom point from a site 3.5 miles (5.6 km) southwest of Mission, Texas in Hidalgo County. It was found by John Boland in 1969 in an orange grove irrigation ditch near the end of a crop dusting airport runway at a depth of about 30 to 36 inches (76 mm to 91 mm). There was considerable burned rock, charcoal, broken chert, and large tree snails in this area. Other artifacts found on the site are Matamoros and one Zorra-like projectile point and one disc-shaped bone bead.

This specimen is of light tan medium quality chert with a glossy finish and waxy feel that might indicate it was heat treated. Dimensions are: L, 39 mm; W, 19 mm; T, 4.2 mm. It is 3.5 mm thick in the fluted area. Edges are ground 14.5 mm and 18 mm. One flute is 20 x 10 mm; one is 17 x 7 mm. It weighs 4.1 grams.

SUMMARY

The six Folsom points reported here adds substantially to the numbers known from Maverick and

Zapata Counties and the specimens from Duval and Hidalgo Counties extends the known distribution of Folsom in south and southwest Texas.

The Duval County Folsom made of chalcedony is unusual in that Largent (1991) reports only one point as being made of chalcedony.

ACKNOWLEDGEMENTS

We wish to extend our sincere appreciation to John Boland, Al Lopez, and Thomas Wooten for the loan of their specimens for study and documentation and to Richard McReynolds for preparation of the illustrations.

References

Chandler, Charles K. and Leo Lopez
1992 A Quarry Site in Western Duval County. *La Tierra* 19(2):12-13.

Hester, Thomas R.
1968 Folsom Points from Southwest Texas. *Plains Anthropologist* 13(4):117.

1974 On Fluted Points and South Texas Archeology. *Texas Archeology* 18(2): 11-14.

Largent, Floyd B., Jr., Michael R. Waters, and David L. Carlson
1991 The Spatiotemporal Distribution and Characteristics of Folsom Projectile Points in Texas. *Plains Anthropologist* 36(137):323-341.

COASTAL BEND ARCHEOLOGICAL SOCIETY

Another local archaeological society our readers may find interesting to participate in is the Coastal Bend Archeological Society, recently risen from a short functioning hiatus, and now a very active group.

A recent business meeting vote has returned their monthly meeting to the first Wednesday of each month. The meetings will be in the Hilltop Community Center, Corpus Christi, at 7:00 o'clock p.m.

Contact Larry Beaman, 303 Rolling Acres Dr., Corpus Christi, Texas 78410 for further information.

DALTON, A CLOSER LOOK

Doug Land

ABSTRACT

Well-made Dalton projectile points and knives of the middle to late Paleo-Indian period occur throughout the High Plains and Woodland regions of mid-continental America and throughout most of Texas. Their great size and superior workmanship reflect more than just mere utility as tools. Like Clovis and Folsom, it is speculated that Dalton was indeed a significant cultural phenomenon that warrants further investigations in terms of being a prelude to the magnificent bison-hunting and horse-using Indian tribes of the historic period of our great West.

THE DALTON TRADITION

While we see many articles on traditional Paleo-Indian subjects, the Dalton Tradition has received little notice. This may be, in part, due to overwhelming interest in other segments of Paleo-Indian studies. The study of Paleo-Indian lifeways usually concentrates on a long sequence of cultural materials (primarily lithic tools used for hunting, cutting, and scraping) for which anthropologist, archaeologist, and geologist have worked out a relative chronological framework, complete with reference names, spatial regions, and time periods. This information is now providing a better vision of the early hunting and foraging groups that roamed over the continent for the past 12,000 years. Dalton, as named for the type site in Missouri, was a tradition of early hunters that exploited the plains, prairies, and woodland margins of the Midwest region during the middle and late Paleo-Indian period. The Dalton Tradition was thought to be a period of time when subsistence strategy turned from that of predominately nomadic big game hunting to one of hunting and foraging, with settlement patterns remaining similar to earlier hunters. This was also during a time of changing climatic and environmental conditions. The Dalton period may have extended into the Early Archaic period in some regions and may have been contemporaneous with earlier groups like Plainview.

The most prolific and easily recognizable tool is the projectile point, constructed of comparative features and recognizable as a cultural time marker. Early investigators like Dr. Edgar H. Sellards worked out meaningful Paleo-Indian chronologies of what he termed the Llano Complex (Clovis), Folsom Horizon, and Plano Complex/Portales Horizon (Sellards 1952:17-75). Components of Llano (Staked Plains), as defined by Sellards, have since been defined in much more detail over the course of the past forty years. Interest in Paleo-Indian studies expands yearly, for many different reasons. For example, Clovis fluted points (11,500-10,950 B.P.)(Haynes 1992:5), hold our interest because they are recognized by most as the earliest formal hunting tool in the Americas, are widely distributed and have unique characteristics (large to medium lanceolate form with basal grinding and flute channels). The Clovis fluted point tradition represents the beginnings of a nomadic, big game hunting lifestyle (supplemented with small game and exploitation of flora) that is scarcely reflected in the archaeological record. Folsom (10,950-10,250 B.P.) (Haynes 1992: 96) represents exceptional technology and a high degree of workmanship associated with the nomadic hunting of now extinct forms of bison. We currently live in a sophisticated society with significant technological advancement, yet we are just beginning to understand Folsom technology and settlement patterns, let alone resourcing, curation, use, and point-making techniques.

Well-made points of the Cody Complex (Scottsbluff and Eden–8,900-8,500 B.P.) (Frison 1978:33; Frison 1987:104) represent exceptional workmanship and a new functional design. Others (Plainview, Hell Gap, Frederick, Agate Basin, Alberta, Quad), to name a few, have their own unique and interesting attributes.

Life on and near the midwestern plains, prairies, and forested hills must have been something to behold, in both ancient times and during more recent historic periods. The lodges, colorful dress, freedom of spirit, and culture of modern day and historic period Indians forms a basis for making conclusions about the Paleo-Indians. Tribes like the Sioux, Osage, Fox, Pawnee, and Mandan were indeed an advanced civilization with many admirable attributes. This is reflected in our modern day perceptions of the history of magnificently adorned Indians who made good use of the horse and exploited bison. Of course history has not always borne this out, to wit, the near destruction of these and other tribes during America's western manifestation in the 1800s, for which disease, cultural conflict, and the quest for land played a major part.

When turning back to look at the Paleo-Indian lifeway, we find a robust and beautifully made group of points or knives called Dalton. Research conjures up a vision of the same late Indian tribes that dominated the Plains and Prairies of the Midwest during the historic period. We soon realize that we are looking at the remnants of a culture that must have been the Prince of the Plains, some seven to ten thousand years ago. With the exception of the horse and European trade goods, the Dalton Culture is speculated to have been similar to the modern historical tribes of the late 1880s.

The Dalton Tradition can only be described as magnificent. Figure 1 is an example of their technology. A review of the literature shows that the Missouri region may have been central to the culture. The basic tool kit of Clovis and Folsom was still in use during Dalton times, however projectile points were no longer being fluted, per se. Most points and knives retained their lanceolate form but were only basally thinned or had relatively short flutes (Figure 1, A and B). A specialized knife, the Dalton Serrated type (Figure 1, C and D) appears to have developed from the broad lanceolate form and some may have been a tool that was important in cultural adaptation to the environment (Chapman 1975:126). This knife was most likely associated with bison hunting, judging from the size of the tool and the use of serration on the cutting blade. A serrated edge is very sharp and cuts meat efficiently, much like our modern bread or tomato knife. Serration also provides a good flake detachment platform when ground. Hafting would have been fairly easy and each knife was easily resharpened by a beveling technique, while still in the haft.

Smaller points also had beveling and may be the result of repeated rejuvenation while still attached to the haft. Retention of the deep, concave base and the development of a flared or eared basal appearance is a diagnostic attribute of Dalton points (Figure 1, A and B). High quality chert and flint were used most often, with a high percentage of Knife River Flint found in various assemblages. Flaking was either random or collateral and similar to other Plano forms found on the Plains. Soft hammer percussion and pressure flaking was used extensively. Dalton forms are numerous and widespread over the continent, much like Clovis and Cody. Dalton may well have derived directly from the use of fluted point technology. They are often associated with Plano-like lanceolate forms and other Paleo-Indian tools.

Woodworking was an important part of the Dalton lifestyle, as indicated by the use of steep-edged scraping and cutting tools, drills, spokeshaves, pebble choppers, and adzes. Spears and spear throwers needed shafts, knives and scraping tools needed handles, and traps, snares and digging sticks needed cutting. Small eyed needles, bone awls, gravers, perforators, flake knives, and scrapers were used for making tailored clothing, containers, and shelter covers.

There was more dependence upon small game like squirrel, cottontail, raccoon, prairie dog, rodents, turkey and grouse. Deer, buffalo, wolves, and bear were also hunted. Mortars, manos or pestles, and grinding slabs were used for the processing of nuts, berries, and seeds.

Bands were probably small and moved frequently, taking advantage of water, wood, game, shelter, and stone resources, much like historic Indians. Individuals adorned themselves with necklaces and ornaments. Ceremonial rituals were conducted and special handling of the dead indicates a belief in life after death.

Dalton type extends over most of the midwestern Plains, from Missouri to Wyoming, south into Oklahoma and Texas, and easterly along the Mississippi River into Arkansas and Louisiana (Johnson 1989:13-28). Dalton influence is also found along the eastern seaboard states as reflected in points like Suwanee (Florida) and Hardaway (North Carolina)(Coe 1964:64). Dalton, as described by Chapman, may in fact be contemporaneous with the Plano Complex as described by Sellards for the Southwest and Great Plains regions. San Patrice and Quad may have been related to Dalton. Regardless of their origin or affiliation, these point makers were indeed a magnificent people. Johnson argues that Dalton dominated the woodlands at the eastern margins of the Great Plains, having derived from

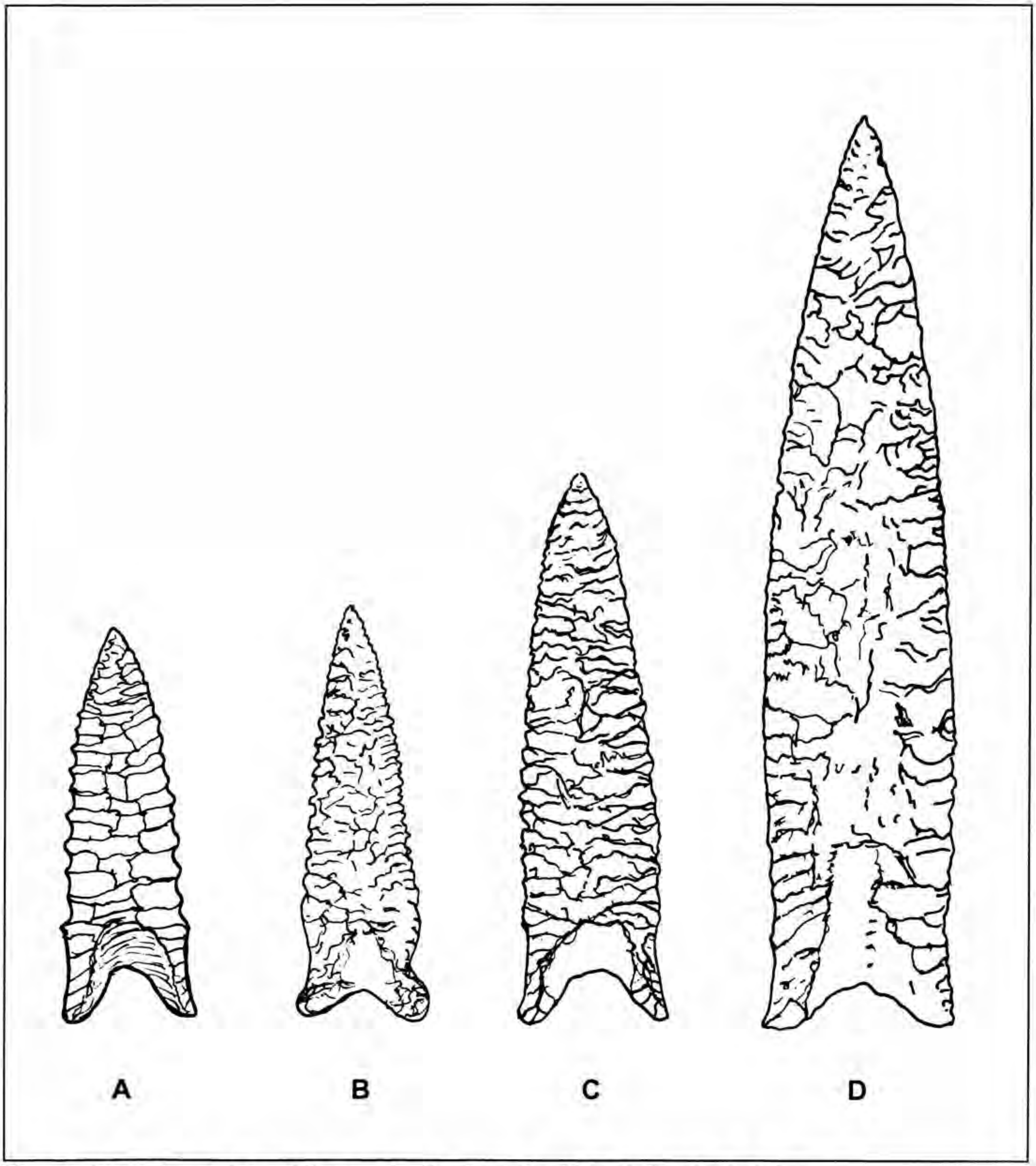


Figure 1. Dalton Serrated. A and B are projectile points; C and D are believed to be knives.

Clovis culture. The Dalton region was penetrated by several plainsmen groups, including Plainview, Cody, and Agate Basin (Johnson 1989:14-20).

As represented by the tools left in evidence for a highly advanced civilization, the Dalton Tradition warrants a closer look.

References

Chapman, C. H
1975 *The Archaeology of Missouri, Vol I.* University of Missouri Press, Columbia, Missouri.

Coe, Joffre L.
1964 *Transactions of the American Philosophical Society, Volume 54, Part 5.* Philadelphia.

Frison, George C.
1987 *The Horner Site: The Type Site of the Cody Cultural Complex.* Academic Press, Orlando

1978 *Prehistoric Hunters of the High Plains.* Academic Press Inc., New York.

Haynes, C. Vance
1992 *How Old Is Clovis? An Interview with C. Vance Haynes.* Mammoth Trumpet, Volume 8, Number 1, December 1992. Center for the Study of the First Americans, Corvallis, Oregon.

Johnson, LeRoy
1989 *Great Plains Interlopers in the Eastern Woodlands during Late Paleo-Indian Times.* Office of the State Archeologist Report 36, Austin.

Sellards, Edgar H.
1952 *Early Man in America: A Study in Prehistory.* Austin, Texas.

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

WHAT'S BUGGING ARCHAEOLOGY?

When you see a reddish or dark stain on an artifact, you call it hematite or ochre or some other convenient potential source of contamination. Recently, it has been found that cooperating (symbiotic) groups of interacting fungi and bacteria jointly form colored colonies on the surfaces of lithics, ceramics, jade, gold, fiber, rocks, and almost any solid surface. Many of the "stains" we observe can be identified as biological colonies. These organisms are found from the Arctic to the Tropics. They are responsible for the development of desert varnish and provide protective coatings on wood and fiber. Since the bio-pairs can use carbon dioxide and nitrogen from the air for their organic structure, they use airborne dust for their mineral structure.

The fact that they are organic offers the possibility of radiocarbon dating. However, when they grow on fibers they cover the original fiber with a bioplastic coating so that radiocarbon dating would measure both the age of the fiber and the coating. However, the coating could be much younger.

These new observations may explain the frequent reports of "blood" on some artifacts and then open a whole new realm of ways to interpret and understand the record of the past.

D. R. Lewis
Associate Editor

TUBULAR STONE PIPES FROM THE LOWER RIO GRANDE VALLEY

C. K. Chandler and Don Kumpe

ABSTRACT

Several tubular stone pipes from the Lower Rio Grande Valley are documented and discussed. Some of these are from northeastern Tamaulipas, Mexico and some from the Texas side of the Rio Grande.

INTRODUCTION

Tubular stone pipes are widely distributed in Texas (Jackson 1940) and are known to occur frequently along the central and southern Texas coast and into the Rio Grande delta region (see Figure 1) where they are sometimes made of pumice. Both stone and pumice tubular pipes are present in the A. E. Anderson collection from Cameron County (Hester 1969). Including fragments, over twenty specimens are known from Cameron County. However, tubular stone pipes are almost unknown in the inland counties of deep South Texas. None are known from Starr, Hidalgo, Willacy, Jim Hogg, Kenedy and Duval Counties.

THE ARTIFACTS

Figure 2, Specimen 1, is a fragment of an engraved tubular stone pipe. It is made of fine grained, very compact, greenish gray sandstone locally called greenstone. This kind of green sandstone occurs near the Arroyo Morteros in Starr County and in large amounts at Arroyo San Francisco in Zapata County. The fragment is a surface find from north of the Salado River in Tamaulipas, Mexico across from inundated Old Zapata in Zapata County, Texas. The exterior is pecked and ground smooth. The interior has deep vertical grooves from gouging out the bowl. Circumferential striations are not visible under magnification of the interior surface. The interior wall is straight and does not taper inward as in most all pipes. The bowl end has been circumferentially grooved about one-half through its thickness and snapped off. This groove and snap attempt appears to be an effort to rejuvenate an already broken pipe. This fragment is about one-third of the original bowl. Projecting the curve of the fragment indicates it would have had an interior diameter of 27 mm with an exterior diameter of 46-47 mm. This fragment weighs 38.7 grams.

The engraved decoration consists of a single zigzag vertical line extending full length of the fragment. Paralleling this line to one side is a vertical row of six shallow pits below two short rows of shallow pits, each in a circumferential pattern that appears to run to the groove where the pipe was snapped off. To the left of these pits is a vertical row of inverted U-shaped notches much like fingernail punctates often seen on East Texas pottery.

Figure 3, A, B, C, Specimen 2, is a tubular stone pipe of an unusual size and shape. It is made of light gray sandstone that, under 10X magnification, shows to be made up of a mixture of fine, medium and coarse sand grains of several colors including clear, tan, red and black. It is well cemented with a silt size matrix but feels grainy. It is from a Falcon Lake shoreline site in Zapata County.

There are no vertical gouge marks on the interior and only a few small circumferential striations could be identified under magnification.

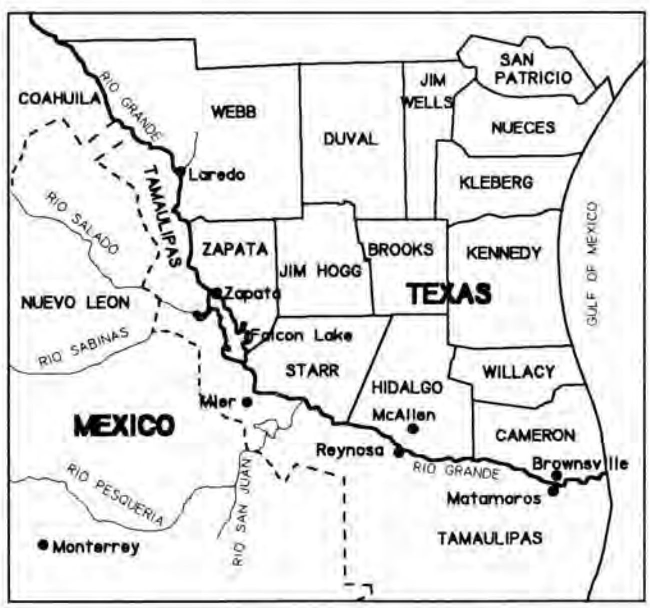


Figure 1. Map of part of South Texas and northeastern Tamaulipas, Mexico, showing area discussed in text.

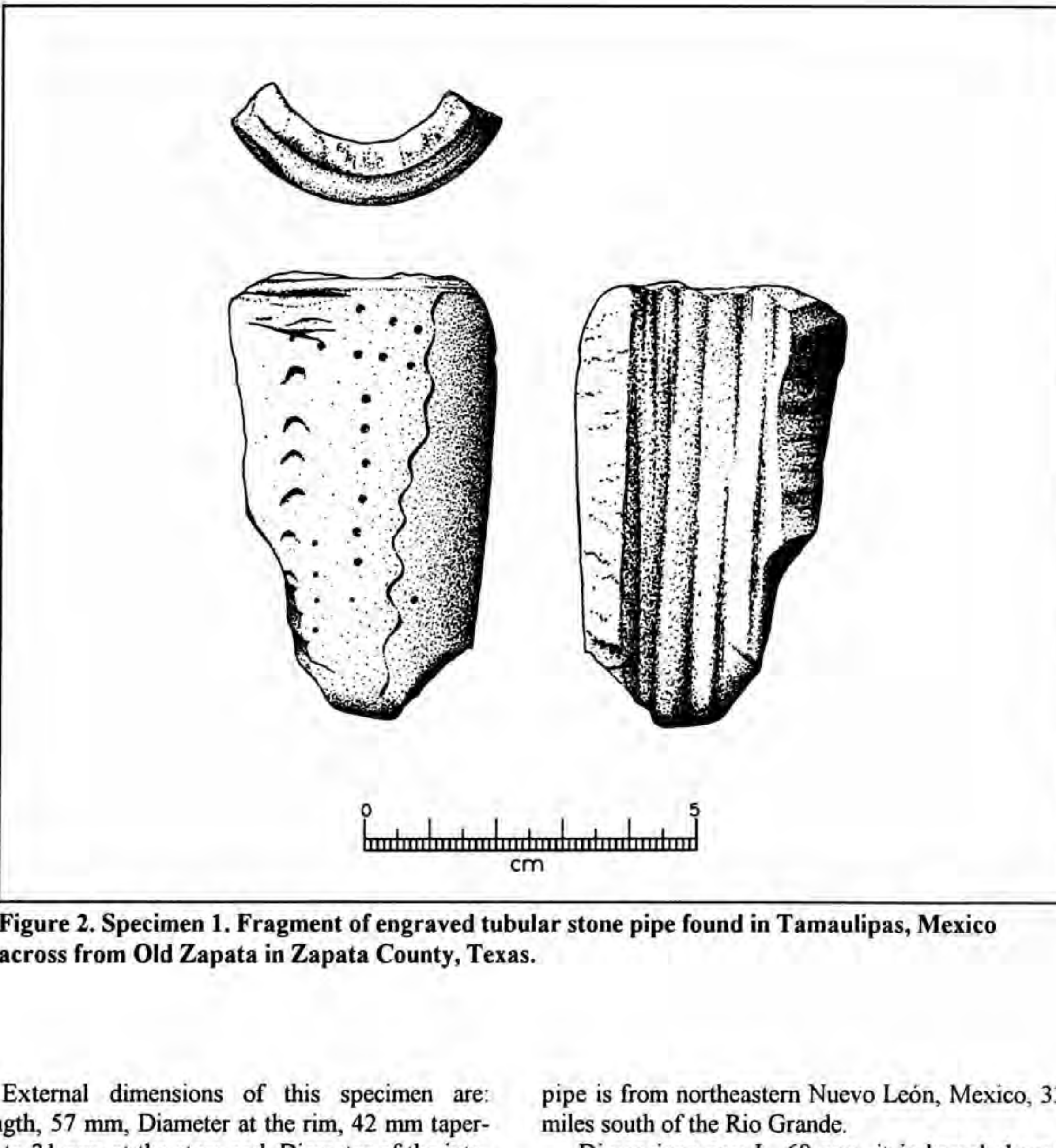


Figure 2. Specimen 1. Fragment of engraved tubular stone pipe found in Tamaulipas, Mexico across from Old Zapata in Zapata County, Texas.

External dimensions of this specimen are: Length, 57 mm, Diameter at the rim, 42 mm tapering to 31 mm at the stem end. Diameter of the interior of the bowl is 31 mm at the rim tapering to 11.4 mm at 33 mm below the rim. The stem aperture maximum diameter is 19 mm tapering to 11 mm at a depth of 20 mm. It weighs 87 grams.

Figure 3 D, E, F, Specimen 3, is a tubular stone pipe made of black sandstone that is unusually heavy. The stone is composed of fine to very fine rounded jet black sand grains with some amber-colored quartz grains. The jet black sand grains are heavily coated with hematite and the amber-colored quartz grains are lightly coated with hematite. This pipe is from northeastern Nuevo León, Mexico, 33 miles south of the Rio Grande.

Dimensions are: L, 69 mm, it is barrel shaped with its maximum diameter of 36 mm near the center. Exterior diameter of the bowl rim is 28 mm and the stem end is 25 mm. The bowl diameter is 21mm tapering to 5 mm at 48 mm deep. The stem aperture is 18 mm in diameter tapering to 5 mm at 21 mm deep. It weighs 133 grams.

Some of the exterior areas have the appearance of smut or burnt grease but under microscopic examination these areas are simply greater concentrations of the jet black grains this stone is made of. We have seen other ground stone artifacts from

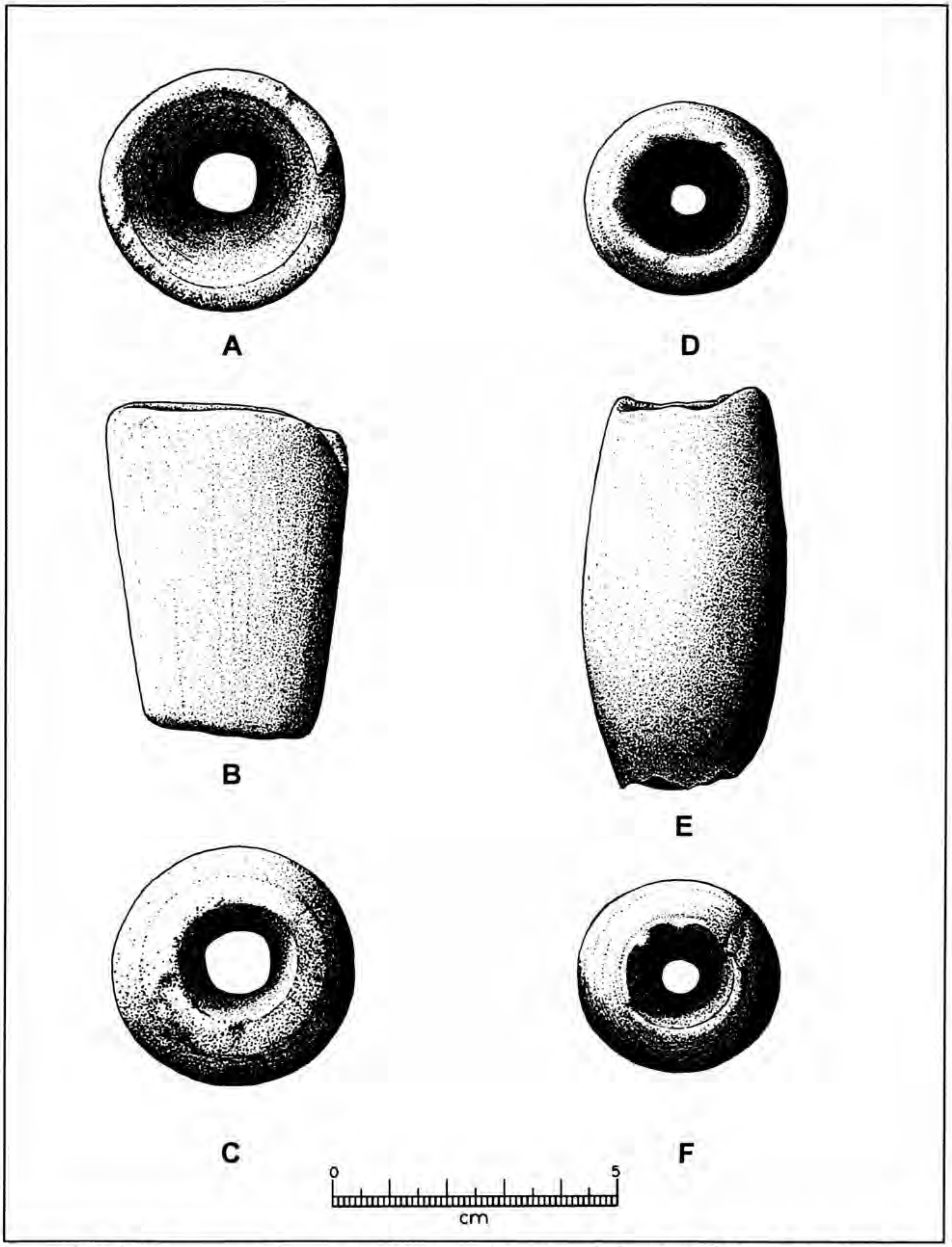


Figure 3. A, B, C: top, center fragment and bottom of Specimen 2, found at a Falcon Lake shoreline site in Zapata County. D, E, F: same views of Specimen 3, from northeastern Nuevo León, Mexico.

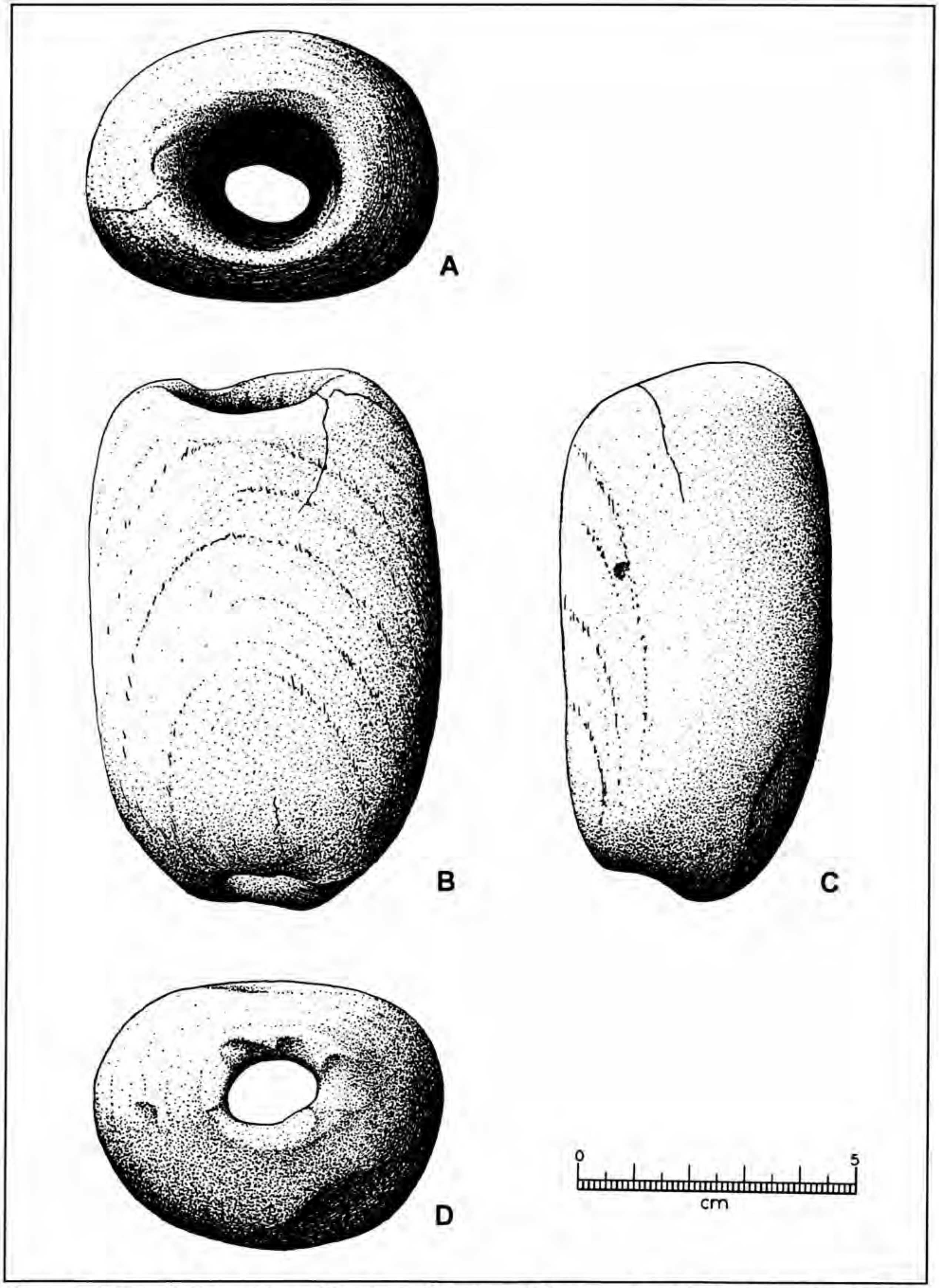


Figure 4. A, Top, B, C, two views of bowl, and D, bottom of Specimen 4, a tubular stone pipe, found near mouth of the Salado River in northern Tamaulipas, Mexico.

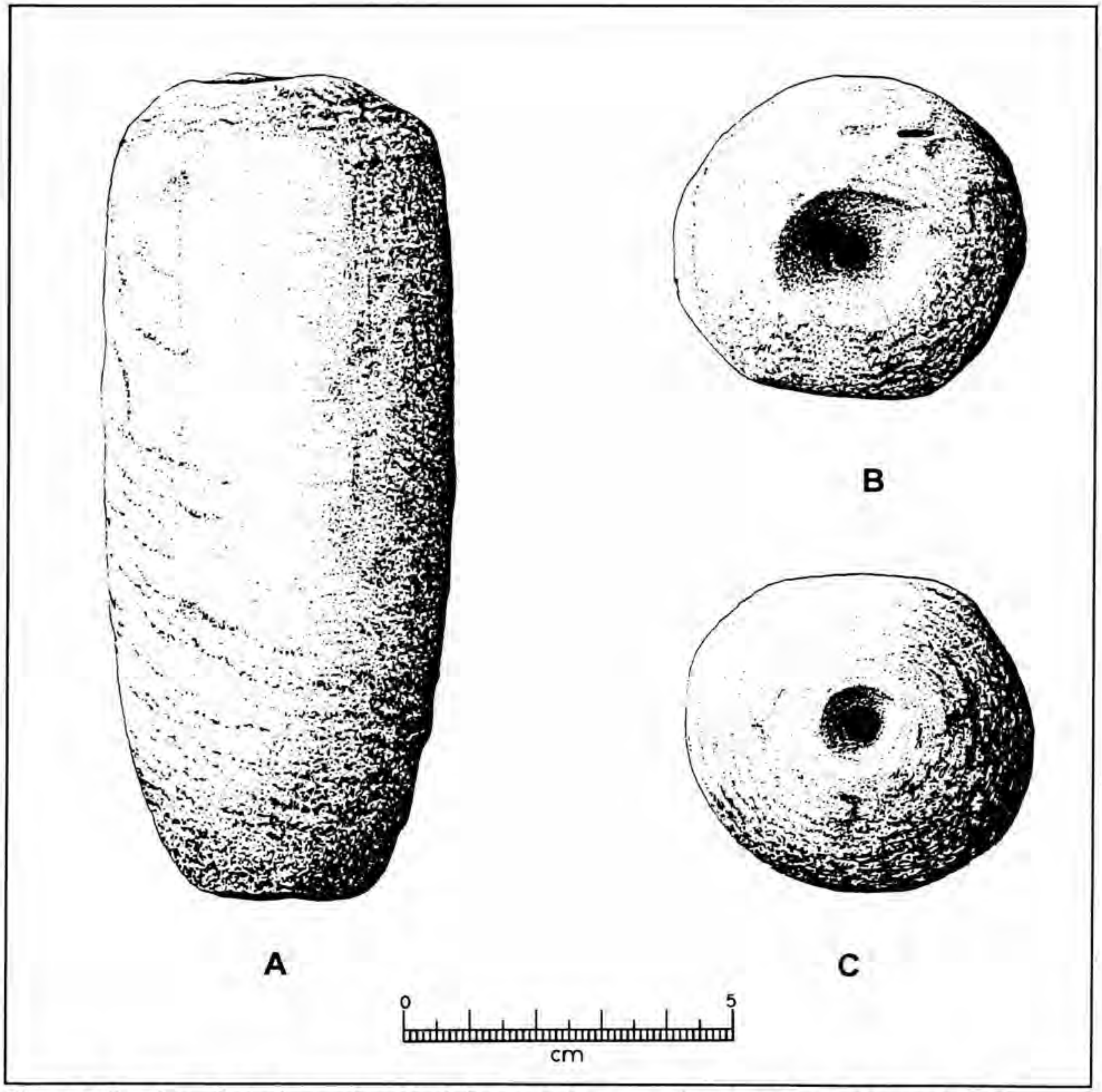


Figure 5. Specimen 5. An incomplete blank for a tubular stone pipe, found near the mouth of the Salado River in northern Tamaulipas across from Zapata County, Texas.

Tamaulipas, Mexico made of this material, one of which is a ground stone in the style of a Waco Sinker.

Figure 4, A, B, C. D, illustrates Specimen 4. It is a tubular stone pipe made of banded tan and reddish sandstone. The sand grains are fine to very fine, rounded to angular, containing liberal amounts of tiny jet black rounded grains that appear to be of the same kind that make up the black pipe material (Specimen 3, Figure 3). These black grains are visible only under magnification.

This specimen is oval with one large flat side. The work of making the bowl was all done from the bowl end with the gouging penetrating through the stem end with no evidence of reaming or gouging from the stem end. The bowl is nearly round at the rim and is 25 to 26 mm in diameter. At 16 mm below the rim the diameter is 23 to 24 mm. Vertical striations are prominent throughout the bowl. Maximum exterior dimensions are: L, 96 mm, diameter

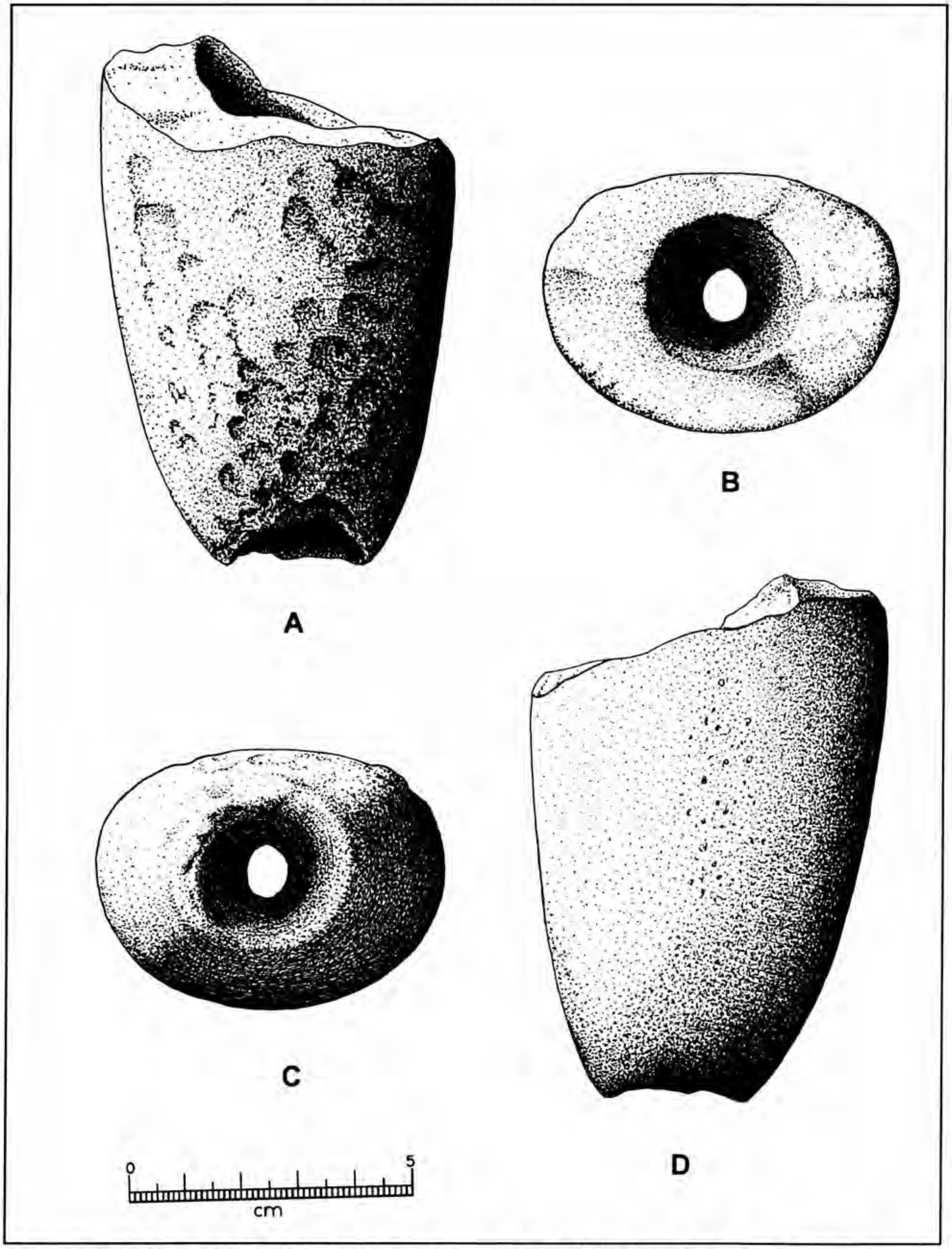


Figure 6. A, B, front and top, C, D, bottom and reverse views of Specimen 6, a tubular stone pipe found in Duval County. Leo Lopez collection.

at center, 62 mm, with a minimum diameter of 47 mm. It weighs 246 grams.

This material appears to be the same kind of sandstone that many of the early buildings in Old Guerrero were made of and may have come from the same quarry area. This pipe is from near the mouth of the Salado River in northern Tamaulipas, Mexico.

Figure 5, A, B, C, Specimen 5, is an incomplete blank for a tubular stone pipe. It has been pecked and rubbed over all exterior surfaces and its shape and size appears to be completed. The maximum length is 126 mm and maximum diameter is 53 mm. This 53 mm diameter is consistent from near the bowl end to mid-length where the walls begin to gently taper to a smaller diameter of 27 mm at the stem end. There is a small conical drilled pit 12 mm in diameter in the stem end and a similar larger pit 25 mm in diameter in the bowl end. From this stage of production the bowls are generally gouged out with a pointed tool and most often reamed. This specimen is made of a medium tan sandstone. It is from near the mouth of the Salado River in northern Tamaulipas across from Zapata County.

Figure 6, A, B, C. D. illustrates Specimen 6. This is a tubular stone pipe made of a light tannish gray sandstone. The bowl rim end is broken and part of the stem end is broken. It is a surface find from Site 41DV133 in Duval County about 15 miles north of Bruni and is in the Leo Lopez collection. It is oval in cross-section with a flattish side that prevents it from rolling when laid down.

Present maximum dimensions are: L, 93 mm, diameter 62 mm, minimum diameter at stem end, 46 mm. Bowl diameter is 25 mm at the break, and the stem aperture is 22 mm in diameter at the rim. It weighs 218 grams and obviously was somewhat heavier before it was broken.

The bowl and stem have evidence of drilling or reaming. Vertical gouge marks are not present but it is probable that both were gouged out and then reamed (Chandler 1992). The exterior is shaped by pecking and abrading.

Figure 7, A, B, C, illustrates Specimen 7. This is a fragmentary stem end portion of a tubular stone pipe made of uniformly pale gray limestone with a light tan calcite coating. It appears to have had a circumferential groove at the point of breakage. This groove may have been for attaching a thong as

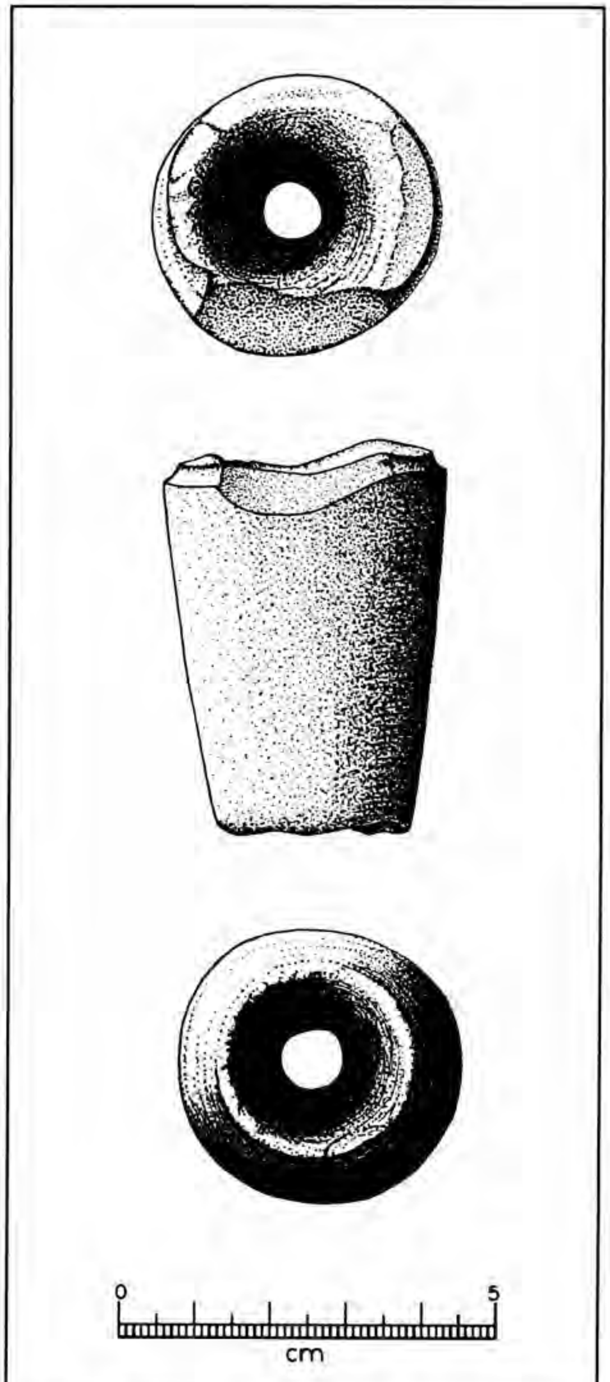


Figure 7. Specimen 7. Top, fragmentary stem, and bottom end of tubular stone pipe, found by Leo Lopez in Duval County.

opposed to being part of an engraved decoration. The outer surface is well smoothed by abrasion. There are vertical gouge marks in both the bowl and stem which are much more prominent in the stem; however, both cavities are reamed to the extent of being quite smooth.

Present maximum exterior dimensions are: L, 53 mm, diameter at break, 38 mm, minimum diameter at break, 35 mm. Bowl diameter at break, 18.6 mm tapering to 9 mm at the bottom (27 mm) deep. Stem end exterior diameter is 27 mm with the stem aperture being 22 mm tapering to 9 mm where it intersects the bottom of the bowl. It weighs 86.5 grams.

This specimen is also a surface find by Leo Lopez from Site 41DV133 in Duval County.

Another fragment of a tubular stone pipe was found at 41DV133 by Leo Lopez but it is no longer available for documentation. It was made of the same type sandstone as Specimen 6, Figure 6.

DISCUSSION AND CONCLUSIONS

While tubular stone pipes are widely distributed in Texas there are still large areas where none are reported.

Jackson's (1940) survey and report of tubular stone pipes found them widely distributed but confined to only 21 of the 254 counties in Texas. Only one specimen was reported from Zapata County and since that early report there have been no additional specimens documented for Zapata County. The one specimen reported here (Figure 3, A, B, C) doubles the known number from Zapata County. The three specimens from Duval County, two of which are illustrated in Figures 6 and 7, expands the known distribution of tubular stone pipes in South Texas.

Anderson stated to Jackson that only four of the 27 specimens in his collection were from northern Tamaulipas where most of his archaeological materials were collected. Twenty-three are from Cameron County. This indicates that such pipes were not so generally used south of the Rio Grande as north (Jackson 1940). The three specimens from northern Tamaulipas, illustrated in Figures 2, 4, and 6, and the one from Nuevo León, Figure 3, greatly increase the number known from northeastern Mexico and suggests cultural similarities for both sides of the Rio Grande.

ACKNOWLEDGEMENTS

We wish to extend our sincere appreciation to Dick Clardy, Michael J. Ryan, Danny Harper and Leo Lopez for the loan of their artifacts for study and documentation and our special thanks to Richard McReynolds for preparation of the illustrations.

References

Chandler, C. K.
1992 Additional Stone Pipes from the Lower Pecos River in Val Verde County, Texas. *La Tierra* 19(2):34-37.

Hester, Thomas Roy
1969 Archeological Investigations in Kleberg and Kenedy Counties, Texas in August, 1967. *State Building Commission Archeological Program Report No. 15*, pp. 35-36, Figure 14.

Jackson, A. T.
1940 Tubular Pipes and Other Tubes in Texas. *Bulletin of the Texas Archeological and Paleontological Society* 12:69-86.

AN INCISED STONE PIPE FROM UVALDE COUNTY, TEXAS

C. K. Chandler

ABSTRACT

This brief paper reports and illustrates a decorated stone pipe from Uvalde County, Texas. Tubular stone pipes are widely distributed in Texas, but those with decoration are extremely rare.

THE ARTIFACT

This stone pipe was a surface find by Richard Gibson in a cultivated field along the Leona River near Fort Inge in Southeast Uvalde County. It is cone shaped, tapering from 51 mm in diameter at the bowl rim to 25 mm at the stem end. It has a maximum length of 80 mm. The bowl interior is 32 mm in diameter tapering to 5 mm with a depth of 60 mm. The stem cavity is 12.6 mm in diameter tapering to 5 mm at a depth of 20 mm. The bowl has been gouged out leaving prominent vertical scars with some circumferential striations, indicating that the bowl was reamed after it was gouged to the desired diameter and depth. The stem cavity shows some evidence of having been gouged prior to being reamed.

This specimen is made of tightly compacted tannish gray sandstone, and it weighs 200 grams. The exterior surface is smooth but not polished. Most of the sand grains are clear quartz of irregular shape, and in some areas they are flattened by the abrading process. Portions of the rim and stem end are broken. This damage appears to be from contact with metal cultivation equipment. The decorative motif is confined to one side only. It is a vertically incised motif bearing a slight resemblance to a snake and is made of two closely spaced parallel zigzag lines topped with two concentric circles having three vertical parallel lines extending like rays to just below the bowl rim. In rock art these circles with rays are often interpreted as sun symbols. The decorations are illustrated with three views in Figure 1.

DISCUSSION

Aboriginal pipes have long been of particular interest to the archaeological community. An early study of the pipe collection at the Texas Archeological Research Laboratory (Jackson 1933, 1940) developed considerable information on pipe types and their distribution in Texas. At that time tubular pipes were known from only twenty-one counties, but their distribution extended from El Paso to Texarkana to Brownsville. The greatest concentration was from central and south Texas. This pattern of distribution has not changed, though a number of pipes have been reported in recent years.

The largest number from a single site appears to be the 12 specimens from the Loma Sandia cemetery site in Live Oak County. All of these are of sandstone and are tubular in shape. None are known to be decorated.

This author finds no record of any tubular stone pipe previously reported from Uvalde County, but two have been reported in Zavala County, which is the next county south(Hill 1978). One of these is a deeply engraved sandstone pipe reconstructed from several fragments. The other is from the same site (41ZV14). and is a fragmentary tubular stone pipe made from light gray speckled soapstone. It was not illustrated, but is of particular interest because of the stone from which it is made.

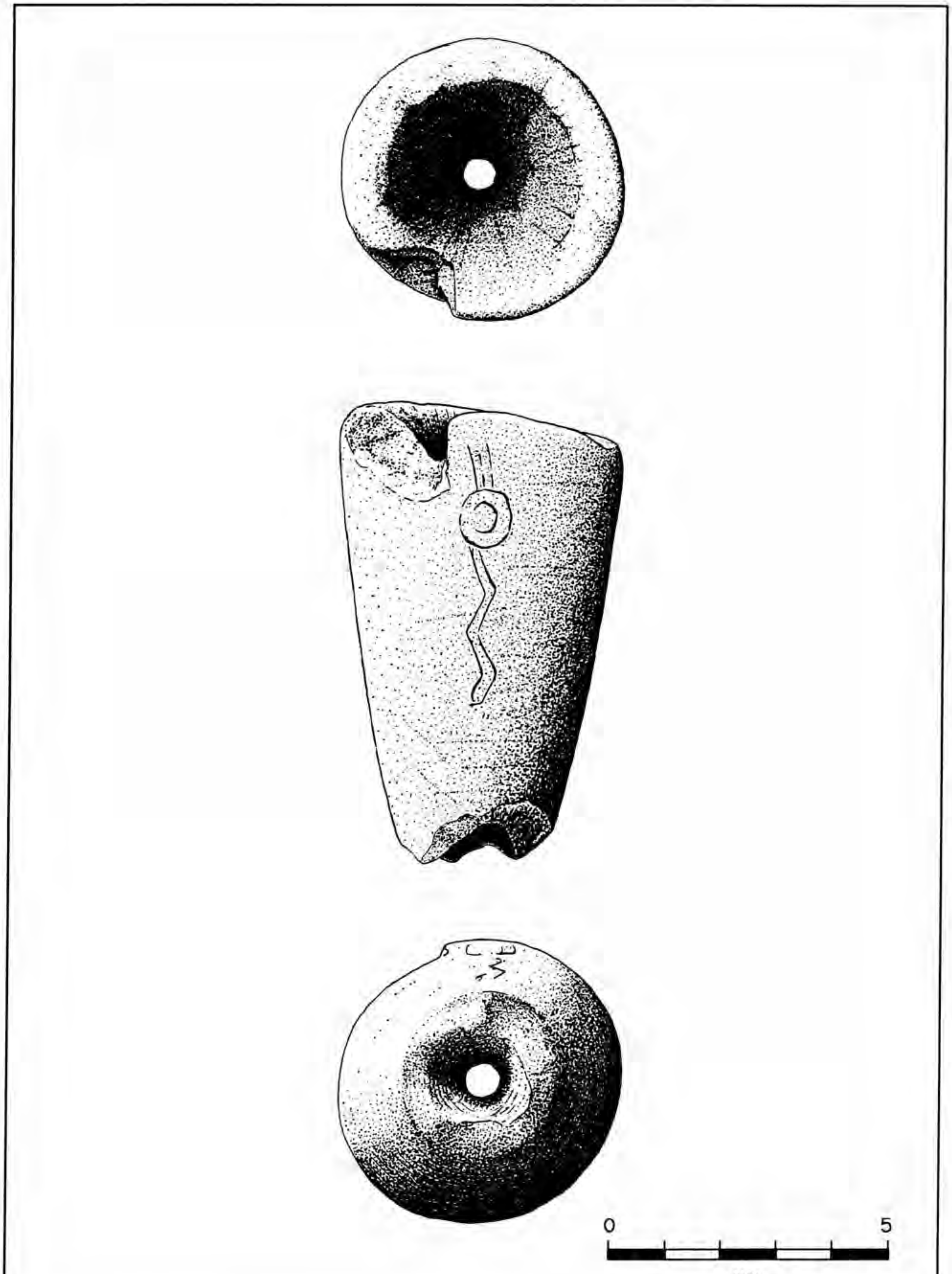


Figure 1. Three views of stone pipe from Uvalde County, Texas.

ACKNOWLEDGEMENTS

I wish to extend my sincere appreciation to Ray Smith for bringing this pipe to my attention and for arranging its loan for documentation. The pipe illustrations are by Richard McReynolds and I extend my sincere thanks to him for his continuing fine work.

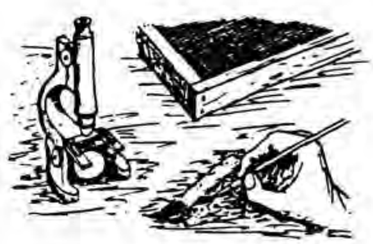
References Cited

Hill, T. C., Jr.
1978 Pipes, Pots, and Little Indian Girls. *La Tierra* 5(3).

Jackson, A. T.
1933 Indian Pipes of East Texas. *Texas Archeological and Paleontological Society* 5.

Jackson (Continued)
1940 Tubular Pipes and Other Tubes in Texas. *Texas Archeological and Paleontological Society* 12.

✣ ✣ ✣ ✣ ✣ ✣ ✣ ✣ ✣ ✣ ✣ ✣ ✣



EARLY CERAMIC WHISTLES FROM THE SAN ANTONIO AREA OF SOUTH TEXAS

C. K. Chandler

ABSTRACT

This report documents two fired clay whistles from the general area of San Antonio in south Texas. This type and style of whistle is believed to be associated with the early mission period in south Texas but may have a more ancient history in the Mayan area of Mexico and Central America.

INTRODUCTION

Since the report by C. K. Chandler and Joe Labadie (1986) of early fired clay whistles from the San Antonio area this author has become aware of two additional fired clay whistles from the same general area (see Figure 1). These new specimens are made in the same style, shape and size as those previously reported. For comparative purposes metric data for those previously reported are reproduced here (Table 1, see next page) along with the same information for the new specimens. The new specimens are identified as Medina and Mann. All measurements except weight are in millimeters. Weight is in grams.

Like those previously reported, these whistles have, in addition to the blow hole in the stem, two vent holes. One of these is located at the junction of the stem with the bulb, and the other hole is at the end of the bulb. The hole in the end of the bulb varies in location. The size, shape and location of the vent holes may account for the variability of the tone and pitch between individual whistles.

The other two specimens have the bulb hole on the top portion of the bulb and it is set to the right side. This may indicate these artifacts were all made by different individuals and are not from a common source.

The Medina whistle produces a shrill piercing sound when blown with both vent holes uncovered. With the bulb end hole covered the tone is much lower. The La Villita and San Juan whistles will not produce a whistling sound unless the bulb hole is covered and then the sound is only one low tone. The Natalia specimen is like the Medina whistle in that it emits a shrill whistle when blown with both vent holes uncovered. With the bulb end hole covered the tone is somewhat lower. The size, shape and position of the vent hole in the stem and the presence or absence of a low raised baffle in the stem below the vent hole appears to also be a factor in how well a given whistle performs. Apparently these whistles were produced by hand with the required holes being formed and placed at the whim of the artisan who produced them. There is no evidence that any of them were pressed into a mold.

The Medina whistle has occasional white specks of a finely ground material that appears to be bone. The previously reported whistles had bone tempering that was more coarsely ground and more readily identifiable. Bone tempering is considered to be the hallmark of the Leon Plain ceramic tradition which was widespread throughout south Texas during the Late Prehistoric period beginning about A.D. 1000 (Hester and Hill 1971). Leon Plain pottery is known to occur a short distance to the southeast of Medina Lake at 41BX708 (Chandler 1986) and at 41BX508 in northwest Bexar County along San Geronimo Creek.

Figure 1. Texas map showing area of report. Solid, Bexar County; Striped, Bandera County.

Table 1. Dimensions of Clay Whistles, including previously reported specimens.

	Medina	Mann	Natalia	La Villita	San Juan Mission
Overall Length (mm)	38	35	33	34	34
Stem Length (mm)	19	10	15	19	19
Stem Diameter (mm)	15	15	13	15	15
Bulb Diameter (mm)	25	22	23	29	29
Weight (grams)	9.7	13.0	7.2	8.0	9.0

The Medina whistle, Figure 2, A1, A2, A3 and A4, was recovered from an eroded gully near Medina Lake Dam by Cindy and Mike Zurovec in 1976. This gully had been partially filled with historic trash dumped in from one side where a burned rock midden was eroding into the gully. A few worked lithics were recovered from the gully along with several ceramic doll pieces. There was a mixture of historic trash with prehistoric debris from the burned rock midden. This clouds the picture as to what context the whistle belongs but it appears to be within the Early Historic time frame. The historic trash that had been dumped into the gully is believed to have been placed there by the people of the Mormon Colony who settled on the Medina River below Bandera in 1854 at a place they called "Mountain Valley." For years afterward, this area was know as "Mormon Camp." The site of this camp is now covered by Medina Lake. This Colony was under the leadership of Elder Lyman Wight and it remained there on the Medina until 1858 when it broke up following the sudden death of Elder Wight.

The Mann whistle, Figure 2, B1, B2, B3 and B4, was found in a plowed cornfield by Lawrence Mann in 1940. This field is between Macdona and Atascosa Community in southwest Bexar County not far west of the Medina River. The whistle was lodged in the dirt stuck on the plow and was found at the turnrow when the plow was cleaned. It could have come from elsewhere in that part of the field. There are no known archaeological sites in this field but the field across the road has a large accumulation of chert that may be an archaeological site.

The mouthpiece of this whistle is broken but this does not adversely affect its whistling performance. Like the Medina and Natalia whistles the Mann whistle produces a shrill piercing sound when blown with both vent holes uncovered. With the bulb end hole covered the tone is much lower.

The surface and interior paste are light tan in color, much lighter than the black to nearly black La Villita, Natalia and San Juan specimens. It is well fired and lightly burnished. Much of the bulb end has thin spalling of the burnished surface and a small area along one side also is flaked off.

Microscopic examination of the Mann whistle revealed no bone inclusions but numerous tabular black inclusions were found. These appear to be lignite.Lignite inclusions in south Texas ceramics has been suggested previously (Chandler, Hindes and Mokry 1991) but not proven.

SUMMARY

Fired clay artifacts of any kind are comparatively rare in inland south Texas. Most of the early ceramics inland from the coast have inclusions of ground bone and these are usually identified as Leon Plain. The Leon Plain ceramic tradition is considered to be of the Late Prehistoric

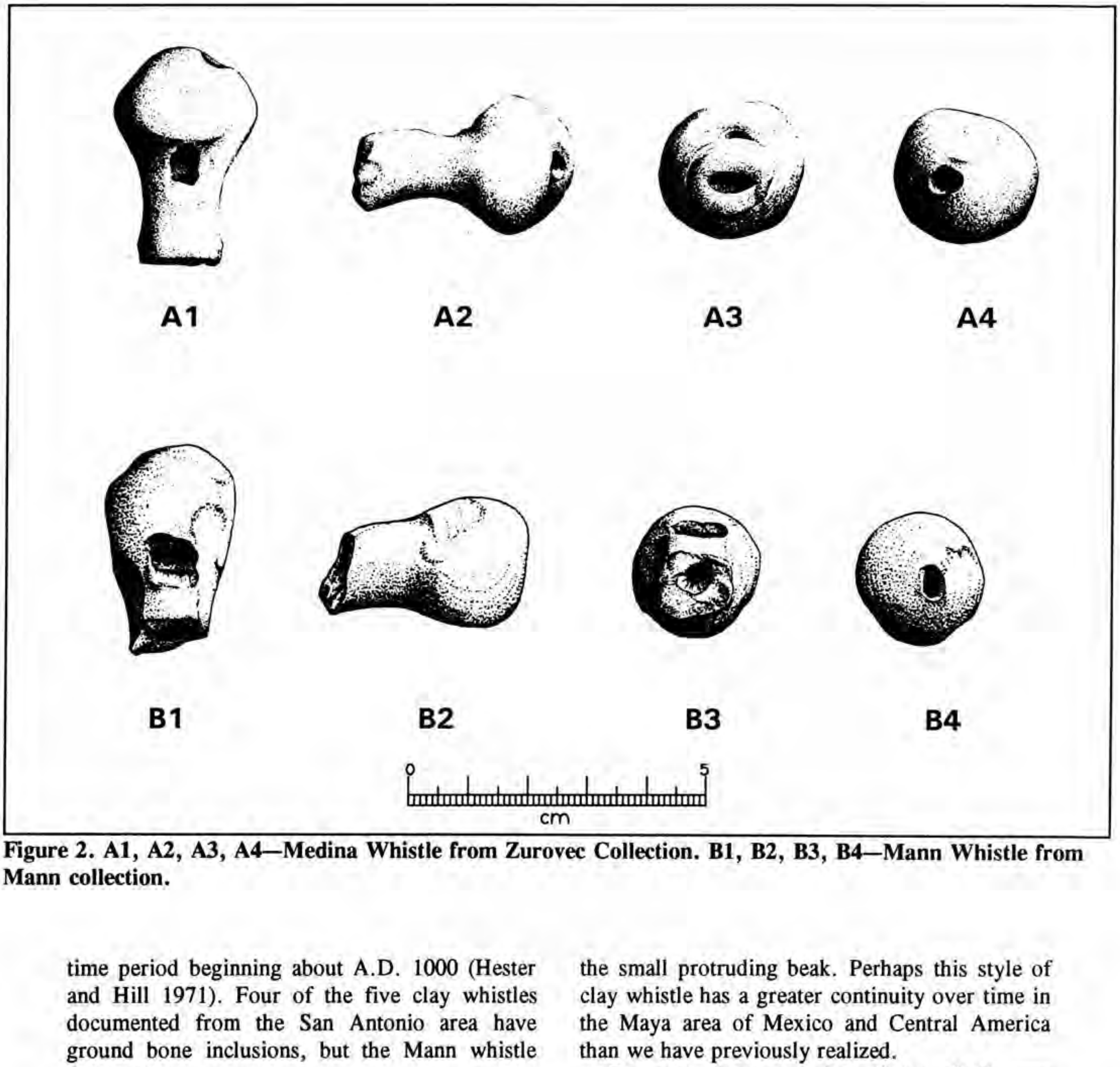


Figure 2. A1, A2, A3, A4—Medina Whistle from Zurovec Collection. B1, B2, B3, B4—Mann Whistle from Mann collection.

time period beginning about A.D. 1000 (Hester and Hill 1971). Four of the five clay whistles documented from the San Antonio area have ground bone inclusions, but the Mann whistle does not.

Since the earlier report (Chandler and Labadie 1986) of this type of whistle, additional information on their distribution and age has been published. In "Mysteries of the Ancient Americas," page 163, a young Maya boy is shown blowing on a small bird-shaped ceramic whistle that is said to have lain silent in a child's tomb for some 3,000 years. The size and shape of this whistle appears identical to those previously reported from the San Antonio area and the two reported here except for the small protruding beak. Perhaps this style of clay whistle has a greater continuity over time in the Maya area of Mexico and Central America than we have previously realized.

For more about ceramic whistles of this type see Chandler and Labadie (1986).

I extend my sincere appreciation to Cindy and Mike Zurovec for the loan of their whistle for study and documentation; to Bobbie McGregor at the Witte Museum for bringing the Mann whistle to my attention, and to Lawrence Mann for his help in getting it properly sourced and documented. My sincere thanks to Richard McReynolds for the excellent drawings.

References Cited

Chandler, Charles K. and Joseph H. Labadie
1986 Two Early Ceramic Whistles from Southern Texas. *La Tierra* 13(2).

Chandler, C. K., Kay Hindes and Edward R. Mokry, Jr.
1991 Fired Clay Figurines from McMullen and Nueces Counties, South-Central Texas. *La Tierra* 18(4).

Hester, T. R. and T. C. Hill, Jr.
1971 An Initial Survey of a Prehistoric Ceramic Tradition in Southern Texas. *Plains Anthropologist* 16(53):195-203.

Hunter, J. Marvin
n.d. *The Lyman Wight Colony in Texas.* Privately printed.

Reader's Digest Association, Inc.
1986 *Mysteries of the Ancient Americas: The New World Before Columbus.* The Reader's Digest Association, Inc., Pleasantville, New York.

AN INTRODUCTION TO LITHIC ANALYSIS

Leland W. Patterson

ABSTRACT

An introduction to lithic analysis is presented to give inexperienced individuals an idea of why and how lithic analysis is done. Checklists are given for major subject areas of lithic analysis, including raw material procurement, lithic manufacturing, tool typology, and functional use of stone tools.

INTRODUCTION

Lithic analysis is a basic part of archaeology because so much of the archaeological record has been preserved as stone tools and manufacturing by-product debris (debitage). The fundamental concerns of lithic analysis are: (1) how and where lithic raw materials were obtained, (2) how lithic materials were processed to make tools (and ornaments), and (3) how stone tools were used. These basic questions are often followed by more complex studies relating to lifestyles, technological change, and trade. Distinctive stone tool types, such as projectile points, can also have chronological significance.

This article will concentrate on basic lithic analysis for Southeast Texas, as applied to archaeological field work and site reports. In this region, lithic analysis is concerned mainly with lithic source locations and campsites. There is little evidence of other specialized intermediate lithic workshop locations. A previously published diagram (Patterson 1984a:Figure 1) of the process for manufacturing bifacial projectile points is shown in Figure 1, with possibilities given for doing various manufacturing stages at different locations.

Lithic analysis involves consideration of raw material procurement, manufacturing processes, stone tool function, and stone tool typology. A brief discussion of each of these topics is given here. As indicated by the title, this article is intended to be an introduction to lithic analysis, and not a complete guide to the subject. The reader will see some of the reasons lithic analysis is important, and some of the analytical methods used. Individuals who participate in archaeological field work should have at least a general idea of why all lithic materials, including small-size flakes, are so carefully collected. Some knowledge of lithic analysis is helpful for better understanding of archaeological site reports.

RAW MATERIAL PROCUREMENT

The first step in lithic manufacturing is to obtain suitable raw materials. A checklist of items to consider for the analysis of raw material procurement is given in Table 1. In Texas, most chipped stone tools were made of siliceous minerals such as chert, jasper, and petrified wood. In West Texas, fine-grain igneous rock types, such as rhyolite and basalt, were also used. In Southeast Texas, primary raw materials used were mainly chert cobbles and petrified wood pieces from alluvial deposits in major river drainages. The Colorado River drainage system has large chert cobbles, mainly north of Eagle Lake. The Brazos River drainage system has small chert cobbles and some petrified wood. The Trinity River drainage system has mainly petrified wood. It is difficult to identify exact geographic locations in Southeast Texas that were source locations for most lithic materials found at campsites, because physical properties of lithic materials at different source locations are similar. No work has yet been done in this region to characterize lithic source locations by use of chemical trace element analysis. Because of the geographic distribution of lithic raw material sources in Southeast Texas, chert is the predominant material found at archaeological sites west of Houston, and petrified wood is the predominant material found at sites east of Houston.

As shown in Figure 1, various degrees of raw material processing can be done at the lithic source location. In Southeast Texas, it was common to produce flake blanks at the lithic source location, and then transport the blanks to campsites for further processing. The production of flake blanks is classified as primary reduction, generally done with a hammerstone. At most campsites in this region, there is little evidence for much primary reduction having been done. Few whole chert cobbles or cores are found at Indian campsites to indicate primary reduction.

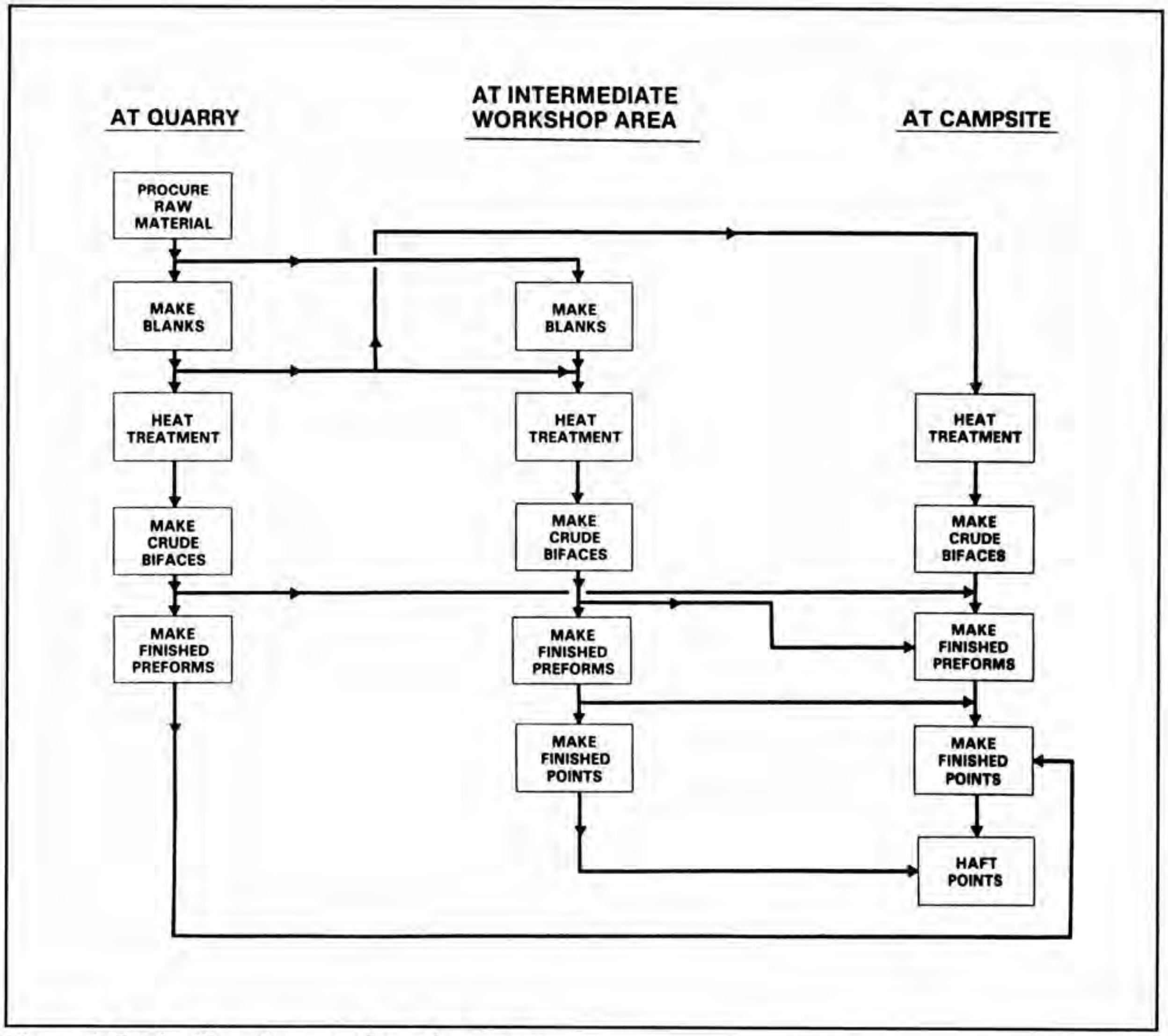


Figure 1. Projectile point manufacturing stages.

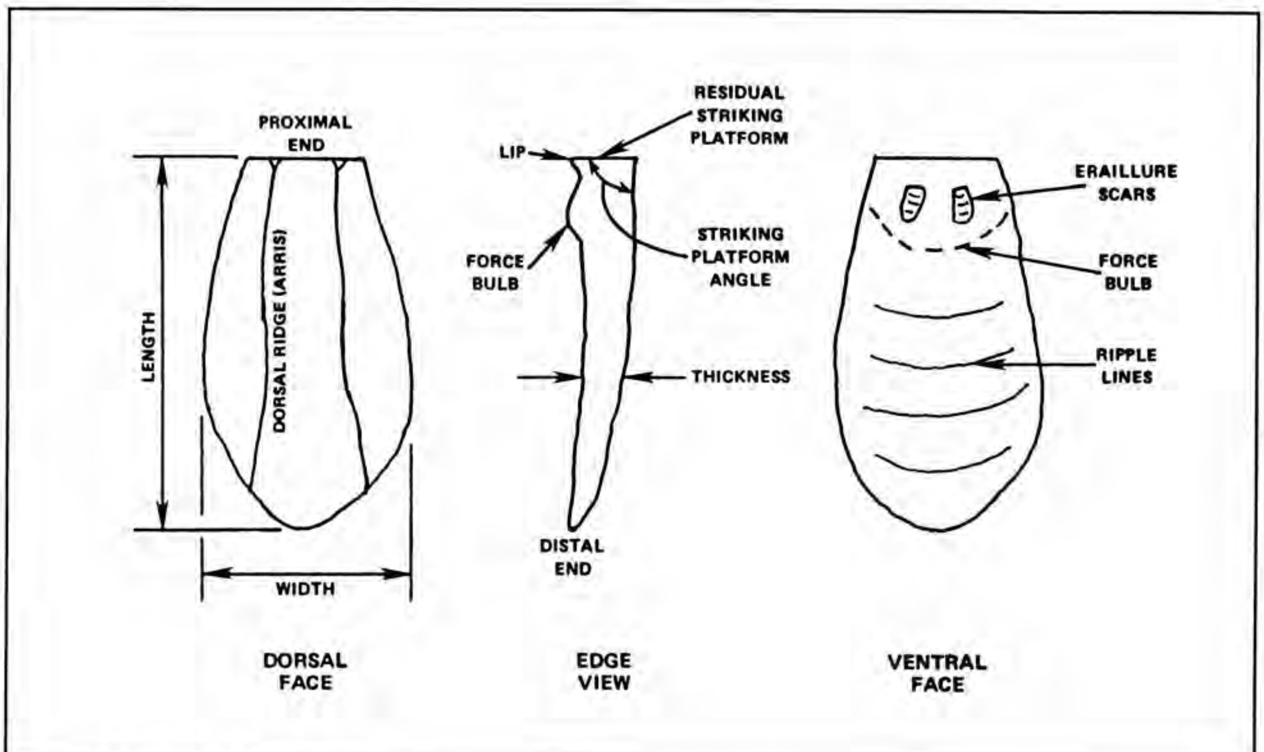


Figure 2. Lithic flake attributes.

Table 1. Checklist for Raw Material Procurement

General Questions

1. Lithic source locations
2. Material types used
3. Form of procurement: quarry procedures, amount of processing at source location

At Lithic Sources

1. Evidence of material testing at site
2. Evidence of primary reduction: hammerstones, cores, debitage characteristics
3. Raw material trimming, preform production
4. Types of cortex
5. Evidence of heat treating
6. Types of raw materials: types and physical properties
7. Quality of raw materials: experimental tests

At Campsites

1. Evidence of primary reduction
2. Presence of flake blanks
3. Presence of cores, chert nodules, large pieces
4. Remaining cortex on flakes and cortex type
5. Size range of flakes: for manufacturing sequence (stage)
6. Raw material classification: type, physical properties, distinctive properties (color, inclusions)
7. Possible sources of raw materials: local, exotic
8. Evidence of heat treating: luster, color, potlid fractures

After primary reduction, flake blanks were often heat treated to improve knapping properties. Heat treatment of chert reduces tensile strength by about 40% (Purdy and Brooks 1971, Patterson 1981a). Most chert found in Southeast Texas is very tough, and heat treatment is almost a necessity to obtain easily worked materials. Fracture for controlled flaking is generally instigated as a compressive failure during initial force application. However, the main fracture plane then develops as a tensile fracture. Reduction in tensile strength by heat treatment not only enables the material to be flaked more easily, but also allows longer flakes to be produced. Heat treatment generally does not decrease the strength of the material enough to cause undue breakage and wear during tool use. The basic concoidal fracture property of chert is not changed by heat treatment. While heat treatment of siliceous raw materials was done extensively in Southeast Texas, it is generally not obvious as to whether heat treatment was done at raw material source locations or at campsites. Heat treatment can be identified by reddish coloration, waxy luster, and potlid surface fracture scars. At site 41FB223, several potlid fracture flakes have been found, which indicates probable heat treament of chert at this campsite. In this region, use of heat treatment can most commonly be identified on chert specimens. Heat treatment of petrified wood was either done less frequently, or is more difficult to identify.

LITHIC MANUFACTURING

The study of lithic manufacturing involves the identification of what types of raw materials were used, what types of product were being made, and what manufacturing processes were being used at a specific location. General product types include bifacial items, flaked on both faces, and unifacial items, flaked on one face. A checklist for analysis of lithic manufacturing is given in Table 2.

Table 2. Checklist for Lithic Manufacturing

General Questions

1. Product types
2. Knapping tool types
3. Manufacturing sequences (stages)
4. Process techniques

Manufacturing Details

1. Knapping tools: hammerstones, billets, pressure flakers
2. Intermediate manufacturing stages (mainly bifaces): preforms, fragments, thinning failures, unfinishied items
3. General evidence of bifacial reduction: flake size distribution, flake attributes
4. Prismatic blade production: blades, polyhedral cores
5. Starting point of reduction: cores, flake blanks, preforms
6. Type of reduction: soft percussion, hard percussion, pressure
7. Flake attributes: length, width, thickness, force bulbs, lips, eraillure flake scars
8. Types of products: projectile points, unifacial tools, bifacial tools

In Southeast Texas, billets for soft percussion flaking and pressure flaking tools were made of antler, and specimens are rarely preserved. Both soft and hard hammerstones were used. Hard hammerstones of quartzite are most commonly found. Soft hammerstones of silicified limestone are occasionally found, with the Edwards Plateau being the probable source.

In this region, the manufacture of a bifacial tool, such as a knife or projectile point, generally involved making a bifacial preform from a flake blank by use of percussive flaking. Final finishing was then done by pressure flaking to produce even, sharp edges, and to form tips and stem shapes for projectile points. Small arrow point preforms can be made by pressure flaking. Intermediate stages of biface manufacture can often be identified at a site by unfinished specimens and manufacturing failures.

The analysis of by-product flakes can give information on the details of manufacturing processes. For example, the amounts of remaining cortex on flakes at campsites can indicate how much raw material trimming was done at remote lithic source locations. This has been discussed based on results from experimental flaking of chert cobbles (Patterson 1981b). The attributes of flakes are shown in Figure 2. Force application at the edge of a core results in flake detachment, with a force bulb on the proximal end of the flake below the point of force application. The ventral (inside face) of the flake represents the fracture plane of the flake removal from the core. It is often stated in the literature that hard percussion flakes often have prominent force bulbs and eraillure flake scars, while soft percussion flakes often have diffuse force bulbs and lips. As may be seen in Figure 2, an eraillure flake scar is a small secondary fracture scar on the force bulb. It can be difficult to distinguish between flakes made by hard and soft percussion, however. Individual flakes made using soft and hard percussors often have the same attributes (Patterson 1982, Bradley and Sampson 1986:43). Soft percussion is generally used for bifacial thinning because a soft percussor allows force to be applied closer to the edge of the core without crushing the edge. This permits removal of thinner flakes.

If a sample is available with a sufficient number of flakes, flake size distribution can be used to identify bifacial reduction (Patterson 1990). Flake size distribution from bifacial reduction typically gives an exponential curve shape for a plot with linear axes or a straight line for a semi-log plot, as shown in Figure 3 for data from the Middle Archaic period at site 41WH19 (Patterson et al. 1987).

The number of lithic flakes is an indication of the amount of lithic manufacturing activity at an archaeological site. Some experiments have shown that manufacture of a dart point preform from a flake blank can yield 60 to 185 by-product flakes of sizes over 10 mm square (Patterson 1990:Table 2).

At some prehistoric sites in Southeast Texas, such as 41HR182 (Patterson 1985a), there were industries which produced small prismatic blades. Prismatic blades are defined as flakes with parallel lateral edges, and at least one ridge on the dorsal face that is parallel to the lateral edges. Prismatic blades have a length over twice the width. Occasionally, prismatic blades can be produced fortuitously. Therefore attributes must be identified to indicate a true prismatic blade industry, where blades were made purposefully. A true prismatic blade industry will produce polyhedral cores, with several parallel flake scars, where a series of prismatic blades were removed. A prismatic blade is made by force application over a ridge on a coreface (Sollberger and Patterson 1976). The fracture plane follows the ridge and produces a long, narrow flake. Large numbers of prismatic blades are another indication that a true prismatic blade industry is present. In Southeast Texas, small prismatic blades were used to make unifacial and bifacial arrow points, and perforators.

Large Paleo-Indian prismatic blades are occasionally found in Southeast Texas, generally with widths of over 20 mm. Specimens are usually made of exotic Edwards Plateau flint, and can be regarded as items that were imported into Southeast Texas.

The manufacture of a unifacial tool is generally a fairly simple process, compared to the manufacture of a bifacial tool. Unifacial tools are quick and easy to make because only a limited working edge is being shaped, while manufacture of a bifacial tool involves shaping of the entire object.

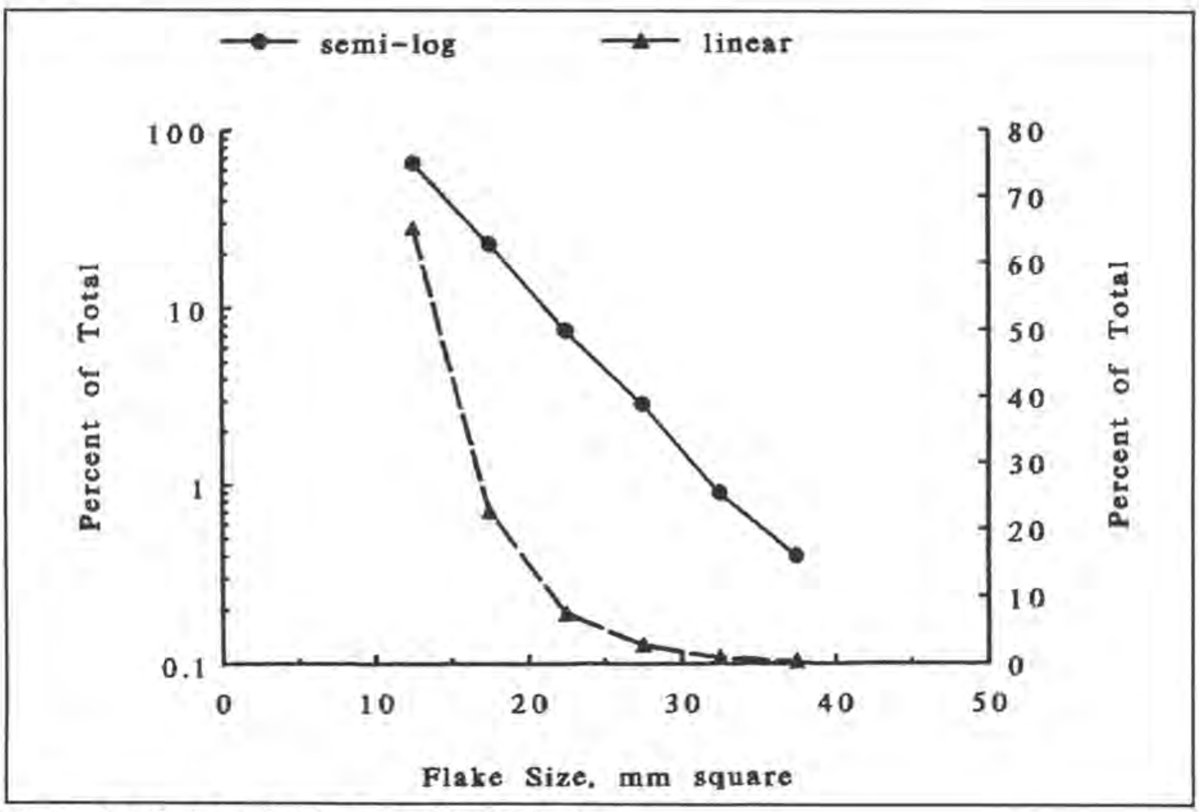


Figure 3. Bifacial reduction flake size distribution.

TOOL TYPOLOGY

The typology of stone tools is concerned with form and style. Much effort is devoted to the classification of projectile points, especially because projectile point types can have chronological significance. It should be noted, however, that use of a projectile point type can have a long time range, so that projectile point types are generally useful only for identifying broad time periods. A study by Patterson (1985b) shows that arrow points in Southeast Texas usually have thicknesses under 5 mm, stem widths under 9 mm, and weights under 2.3 grams. Dart points have larger measurements for these metric attributes.

Standard references by Suhm and Jelks (1962) and Turner and Hester (1993) can be used for classification of most projectile points found in Texas. Specific projectile point types are classified by overall shape, stem shape (when present), and other attributes such as ground stem edges. Tabulations of chronologies of dart points (Patterson 1991a) and arrow points (Patterson 1991b) list most projectile point types found in Southeast Texas. Justice (1987) has shown that some projectile point types have very wide geographic distributions. It is common to see the same projectile point type with different names in different regions. Justice (ibid.) has grouped projectile point types that are morphological correlates.

Aside from projectile points, bifacial tool types found in this region are knives and drills (perforators). Dart point preforms are sometimes confused with bifacial knives. Bifacial knives are often asymmetrical, while dart point preforms generally have bilateral symmetry.

Unifacial tool types found in Southeast Texas include gravers, scrapers, perforators, notched tools, and denticulates. Gravers are flakes with purposefully formed pointed areas. Scrapers generally have fairly steep (over 60 degrees) edge angles formed by a series of parallel flake removals on one face. A notched tool has a purposefully made notch in an edge, generally made by three or more flake removals, as opposed to a fortuitous notch. Unifacial perforators are like bifacial drills, except that shaping retouch is only on one face. Denticulate tools have saw-tooth edges formed by a series of small notches. It is common for unifacial tools to have retouch on the dorsal face, with the flat ventral face having been used as the platform for force application.

In this region, heavy unifacial tools were only made in the Paleo-Indian period (Patterson et al. 1987). Many Paleo-Indian unifacial tools are combination graver-scrapers. Heavy unifacial tools have large dimensions of length, width, and thickness, with thickness often over 10 mm. The Albany side-notched hafted scraper is a Paleo-Indian tool type that is commonly unifacial, but is occasionally of bifacial form (Turner and Hester 1993:277; Patterson 1991c).

A few corner-tang bifaces are found in Southeast Texas (Hall 1981; Patterson et al. 1987), but this is essentially a Central Texas artifact type.

Ground stone items found in Southeast Texas are usually grinding and abrading tools such as manos and metates. Bannerstones (Duke 1989) and boatstones (Hall 1981) are occasionally found. These are imported items made of exotic materials, such as from Arkansas (Hall 1981:Figure 55). Ground stone beads (Site 41FB42 HAS field notes), another type of imported item, are rare in this region.

A checklist for analysis of tool typology and functional use is given in Table 3.

STONE TOOL FUNCTIONS

Stone tools can be used for many functions performed by modern metal hand tools, such as scraping, planing, cutting, sawing, and drilling. Stone tool function can often be inferred from tool form. A unifacial tool with a steep, uniform edge can be used experimentally for scraping and planing. Cutting tools generally have acute edge angles of less than 30 degrees. A drill or perforator has a long bit that resembles a modern drill bit.

Tool form does not always indicate actual tool functional use. For example, the sharp edge of a dart point could also have been used as a knife for cutting. Ethnographic data can be helpful in showing at least some functions of a stone tool type. A notched tool is sometimes called a spokeshave, and there are ethnographic examples of this functional use (Hayden 1977:Figure 5). One surprising ethnographic example is an illustration of an Australian aborigine using a denticulate to shape a wood shaft by shaving, rather than use of this tool as a saw (ibid. 977: Figure 6). Of course, a denticulate can also be used as a saw.

Table 3. Checklist for Tool Typology and Functional Use

General Questions

1. Tool types
2. Functional uses of tools: cutting, scraping, etc.
3. Relationship of tool use to site activities
4. Nonlocal relationships: mobility and trade

Typology

1. Projectile point types
2. Bifacial tool types
3. Unifacial tool types
4. Utilized flakes
5. Ground stone items
6. Nonutilitarian items

Functional Use

1. Inferences from tool forms
2. Edge wear patterns
3. Experimental and ethnographic data
4. Evidence from site activities (butchered bone, etc.)

Mobility and Trade

1. Exotic materials
2. Nonlocal artifact types
3. Relationships to known trade and mobility patterns

In Southeast Texas, few formal unifacial tool types were used after the Paleo-Indian period. The unretouched utilized flake became the dominant tool type, often casually selected from bifacial thinning debitage. A freshly made chert flake has a sharper edge than a steel knife blade, but dulls faster. Unretouched flakes can easily be used for scraping, cutting and, planing. Edge wear patterns are used to identify flakes that have been used as tools. Tringham et al. (1974) have shown typical chert flake edge wear patterns for scraping, planing, and cutting that can be replicated and observed with low-power magnification (10x-80x). It is not always possible to demonstrate that a flake has been used as a tool, however. Cutting of soft materials, such as meat, often results in little edge wear (Patterson 1984b). In a deer butchering experiment (Patterson 1974), a good cutting edge wear pattern could be observed only near the end of the job. If a flake edge is used for more than one type of function, such as cutting and scraping, the edge wear pattern can be confusing.

Edge wear from longitudinal cutting action gives a series of small scallops with polish on the high points (Tringham et al. 1974; Patterson 1974). Edge wear from planing is commonly in the form of a finely nibbled edge (Tringham et al. 1974). Edge wear from scraping is like a miniature pattern of retouch on a purposefully made scraper, with a series of small, parallel flake scars, and a resulting steep edge angle.

Some analysts have used a high-power metallurgical microscope to study edge wear patterns. There are several difficulties in the use of this analytical method. Use of high-power magnification is a very slow procedure, and results are often controversial. Analysts such as Keeley (1980), Vaughn (1985), and Yerkes (1987) claim to be able to identify many specific types of materials that were being worked, by identifcation of highly magnified edge wear patterns. There can be a bewildering number of wear patterns identified, and experimental wear patterns cannot always be reproduced. For example, Schultz (1992) did not obtain the same wear patterns for bison hide processing that were obtained by some other investigators. One criticism of high magnification wear pattern study is that the analyst can obtain desired wear patterns simply by looking at different areas of a specimen. In any event, the use of low-power magnification to study edge wear patterns is the most practical technique for most archaeological field work, especially where individuals do not have special training.

SUMMARY

Fundamental considerations of basic lithic analysis have been reviewed here to give inexperienced individuals an idea of why and how lithic analysis is done. Enough references have been given to allow interested individuals to do more detailed study of this subject. The checklists presented here can be used as a guide for processing artifacts in the laboratory. Lithic analysis is a broad field with many subtopics. It should be noted that lithic analysis is the study of technology, with limitations to inferences that can be made regarding the non-technical aspects of cultural organization. Many lithic artifact types have geographic distributions that far exceed the limits of specific cultural identity. For example, the Albany scraper has a geographic distribution from East Texas to South Carolina (Patterson 1991d). Used in proper context, lithic analysis is important for the study of prehistoric and protohistoric lifeways, chronology, technological change, and sometimes trade patterns.

ACKNOWLEDGEMENT

This article has been reprinted from the Houston Archeological Society Journal 105:16-25, 1993, with permission of the HAS.

References Cited

Bradley, B. and C. G. Sampson
1986 Analysis by Replication of Two Acheulian Artifact Assemblages. In C.N. Bailey and P. Callow (eds.), *Stone Age Prehistory*, Cambridge University Press.

Duke, A. R.
1989 Additional Bannerstones from Texas. *Houston Archeological Society Journal* 95:12-15.

Hall, G. D.
1981 *Allens Creek: A Study in the Cultural Prehistory of the Lower Brazos River Valley, Texas*. Texas Archeological Survey, Research Report 61.

Hayden, B.
1977 Stone Tool Functions in the Western Desert. In: R. V. S. Wright (ed.), *Stone Tools as Cultural Markers*. Humanities Press.

Justice, N. D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States*. Indiana University Press.

Keeley, L. H.
1980 *Experimental Determination of Stone Tool Uses: A Microwear Analysis*. University of Chicago Press.

Patterson, L. W.
1974 Lithic Wear Patterns in Deer Butchering. *Texas Archeology* 19(2):10-11.

1981a Fracture Force Changes from Heat Treating and Edge Grinding. *Flintknappers' Exchange* 4(3):6-9.

1981b A Chert Cobble Flaking Experiment. *La Tierra* 8(4):29-34.

1982 Replication and Classification of Large Size Lithic Debitage. *Lithic Technology* 11(3): 50-58.

1984a Comments on Studies of Thermal Alteration of Central Pennsylvania Jasper. *American Antiquity* 49(1): 168-173.

1984b Experimental Meat Cutting with Stone Tools. *La Tierra* 11(3):17-20.

1985a A Long Occupation Sequence at Site 41HR182, Harris Co., Texas. *Houston Archeological Society Journal* 81:11-20.

1985b Distinguishing Between Arrow and Spear Points on the Upper Texas Coast. *Lithic Technology* 14(2): 81-89.

1990 Characteristics of Bifacial Reduction Flake Size Distribution. *American Antiquity* 55(3): 550-558..

1991a Dart Point Chronologies in Southeast Texas. *Houston Archeological Society Journal* 101:1-5.

1991b Arrow Point Chronologies in Southeast Texas. *Houston Archeological Society Journal* 101:6-11.

1991c Relationships of Early Notched Projectile Points in Southeast Texas and the Greater Southeast Woodlands. *Houston Archeological Society Journal* 100:14-20.

1991d The Albany-Edgefield Hafted Scraper. *The Chesopiean* 9(2): 7-13.

Patterson, L. W., J. D. Hudgins, R. L. Gregg, and W .L. McClure

1987 *Excavations at Site 41WH19, Wharton County, Texas.* Houston Archeological Society, Report No. 4.

Purdy, B. A. and H. K. Brooks

1971 Thermal Alteration of Silica Minerals: An Archeological Approach. *Science* 173:322-325.

Schultz, J.M.

1992 The Use-Wear Generated by Processing Bison Hides. *Plains Anthropologist* 37(141):333-351.

Sollberger, J. B. and L.W. Patterson

1976 Prismatic Blade Replication. *American Antiquity* 41(4):517-531.

Suhm, D. A. and E. B. Jelks

1962 *Handbook of Texas Archeology: Type Descriptions.* Texas Archeological Society, Special Publication No. 1.

Tringham, R., G. Cooper, G. Odell, B. Voytek, A. Whitman

1974 Experimentation in the Formation of Edge Damage: A New Approach to Lithic Analysis. *Journal of Field Archaeology* 1(1/2):171-196.

Turner, E. S. and T. R. Hester

1993 *A Field Guide to Stone Artifacts of Texas Indians.* Gulf Publishing Co.

Vaughn, P. C.

1985 *Use-Wear Analysis of Flaked Stone Tools.* University of Arizona Press.

Yerkes, R.W.

1987 *Prehistoric Life on the Mississippi Floodplain.* University of Chicago Press.

A FOLSOM POINT FROM TARRANT COUNTY, NORTH CENTRAL TEXAS

C. K. Chandler and Burnley Duke Smith

ABSTRACT

This paper documents and illustrates a Folsom point from the Dallas-Fort Worth area of north central Texas. It is a surface find from the northeast corner of Tarrant County.

INTRODUCTION

Folsom points are widely distributed in Texas but are nearly absent from north central Texas (Largent et al. 1991). Those identified from this area are nearly all from three contiguous counties bordering the Red River. None were identified from Dallas and Tarrant Counties when the statewide survey was conducted (ibid.). Since that survey one Folsom point from southeast Dallas County has been documented and published (Smith and Garrett 1992). That specimen is a medial blade fragment with oblique parallel flaking. This type flaking is rare for Folsom points (Sollberger 1985; Kelly 1990:15.

ARTIFACT DESCRIPTION

This specimen (Figure 1) is a complete Folsom point made of tannish gray semitranslucent chert of excellent quality. It has the appearance and feel of having been heat treated but this may be a natural characteristic of this quality material. It is 44 mm long with a maximum width of 21 mm at 26 mm above the basal ears. Maximum thickness is 3.6 mm at 23 mm above the base. It is 3.2 mm thick in the fluted area. Base width is 18.8 mm with a basal concavity of 2.6 mm. Flaking is fine oblique parallel with an average of 5.5 flake scars per centimeter of lineal edge. It has a single flute scar on each face that is 10 mm wide and 35 mm long. Lateral edges are ground 21 and 22 mm. It weighs 4.9 grams.

This point was found by Dr. and Mrs. James Richmond in the early 1950s in the spillway area of Grapevine Lake dam. It was a surface find at the time it was found but was probably exposed by earth-moving equipment.

The Grapevine Lake dam is on Denton Creek in the northeast corner of Tarrant County just outside the north end of the Dallas-Fort Worth Regional Airport. The dam is wholly within Tarrant County but much of the lake is in Denton County.

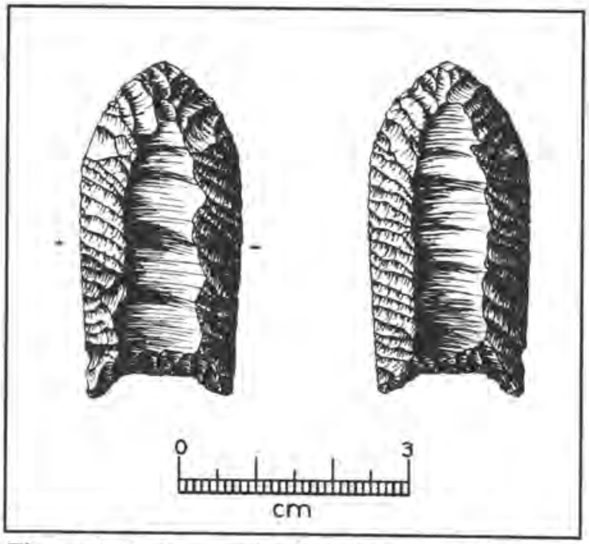


Figure 1. Folsom point from Tarrant County, Texas.

This report is the first documentation of a Folsom point from Tarrant County and extends the number and distribution area of Folsom occurrences in north central Texas.

ACKNOWLEDGEMENTS

We extend our sincere appreciation to Dr. and Mrs. James Richmond for the loan of this specimen for documentation, and express our thanks to Richard McReynolds for the illustration.

References Cited

Kelly, Thomas C.
1990 The La Vernia Folsom Point, Wilson County, Texas. *La Tierra* 17(2): 14-24.

Largent, Floyd B., Jr., Michael R. Waters, and David L. Carlson
1991 The Spatiotemporal Distribution and Characteristics of Folsom Projectile Points in Texas. *Plains Anthropologist* 36(137): 323-341.

Smith, Timothy D. and Clay Garrett
1991 A Folsom Point from Southeast Dallas County, Texas. *La Tierra* 19(1):13-14.

Sollberger, J. B.
1985 A Technique for Folsom Fluting. *Lithic Technology* 14(1):41-50.

AUTHORS

C. K. CHANDLER, Documentation Chairman of STAA, is a retired railroad management official and engineering consultant with an insatiable interest in Texas archaeology. He is Past President of the Texas Archeological Society and a member of the Coastal Bend Archeological Society. C. K. was the 1985 Robert F. Heizer Award winner for his extensive work in south Texas archaeology (see Vol. 13, No. 1). Also, in 1985, he recorded more archaeological sites with the Texas Archeological Research Laboratory than any other individual. C. K. is a valued contributor of manuscripts to *La Tierra* and the *Bulletin of the Texas Archeological Society*, covering such varied subjects as metal points, rock art, and hearthfield sites in Terrell County. He has been honored by being named a TAS Fellow, and was also appointed as a steward for the Office of the State Archeologist. The Chandlers reside in northern San Antonio.

DON KUMPE is a lifelong native of the Lower Rio Grande Valley. He and his wife, Mary, own and operate a jewelry store on South Padre Island. The store's specialty is jewelry that is designed and finished "while-u-wait." Don is a member of STAA. As a teenager he began collecting artifacts while on camping trips in Starr County. This led to his 30 years of continuous interest in the archaeology of the Lower Rio Grande River.

DOUG LAND is a long-term member of STAA and TAS, with interest in Paleoindian archaeology and lifestyles, lithic and primitive technology, flint-knapping, and study of the American fur trade. Retired from the Air Force, Doug is now a senior systems engineer with Computer Sciences Corporation-Professional Services Group, Dumfries, Virginia. Doug has authored many articles for STAA and other publications throughout the nation; including The Gregg Ranch Site (41HY131), TAS Bulletin Vol. 55, 1984. Doug would like to see someone write an article on: "What Do We Know About Bandy," or "Early Triangular." Little is known about these Early-Early Archaic projectile points that may have coexisted with late Paleoindian.

LELAND W. PATTERSON is a retired chemical engineer whose last professional position was Manager of Environmental Affairs, Engineering for Tenneco, Inc. His work included cultural resource studies for environmental impact studies and the general overview of any archaeological work required. He has published over 300 articles in local, state, regional and national journals, including *American Antiquity, Plains Anthropologist, Journal of Field Archaeology* and the *Bulletin of the Texas Archeological Society*. Lee has received the Golden Pen award from the Texas Archeological Society for achievement in archaeological publication, and on April 22, 1994 was given the Crabtree Award at the annual meeting of the Society for American Archaeology in Anaheim, California. Patterson is working on an integrated synthesis of Southeast Texas that covers all time periods and geographic subregions.

LARRY RIEMENSCHNEIDER is from Veribest in Tom Green County. He graduated from Texas A&M University with a Bachelor of Science degree in Agricultural Education. He currently is a Regional Steward assisting the Office of the State Archeologist in Runnels County. He has coordinated archaeological projects in Reagan, Irion, Tom Green, Sterling, and Runnels Counties.

BURNLEY DUKE SMITH received his Bachelor of Science degree from Trinity University in 1955. Since retiring from AT&T in 1984 he has audited courses at the University of Texas at San Antonio and has participated in Archaeological Field Schools sponsored by the Southern Texas Archaeological Association, the Texas

THE SOUTHERN TEXAS ARCHAEOLOGICAL ASSOCIATION

The Southern Texas Archaeological Association brings together persons interested in the prehistory of south-central and southern Texas. The organization has several major objectives: To further communication among avocational and professional archaeologists working in the region; To develop a coordinated program of site survey and site documentation; To preserve the archaeological record of the region through a concerted effort to reach all persons interested in the prehistory of the region; To initiate problem-oriented research activities which will help us to better understand the prehistoric inhabitants of this area; To conduct emergency surveys or salvage archaeology where it is necessary because of imminent site destruction; To publish a quarterly journal, newsletters, and special publications to meet the needs of the membership; To assist those desiring to learn proper archaeological field and laboratory techniques; and To develop a library for members' use of all the published material dealing with southern Texas.

(See Table of Contents)